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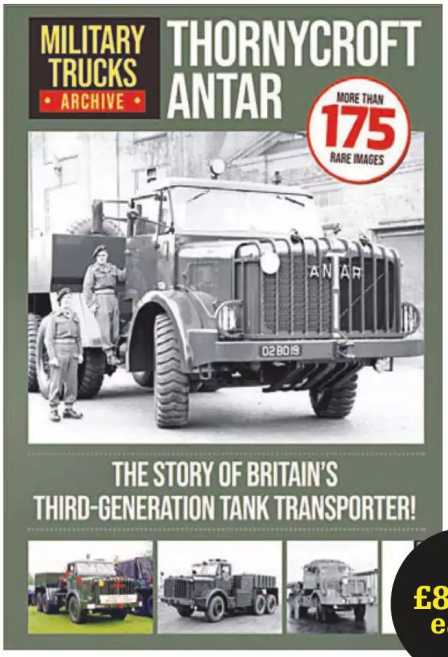

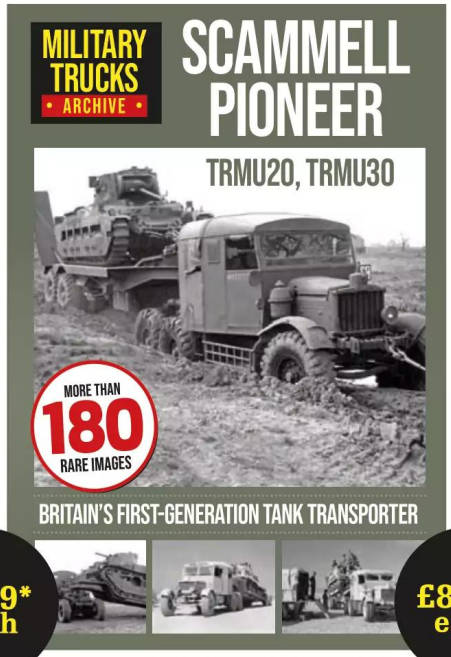

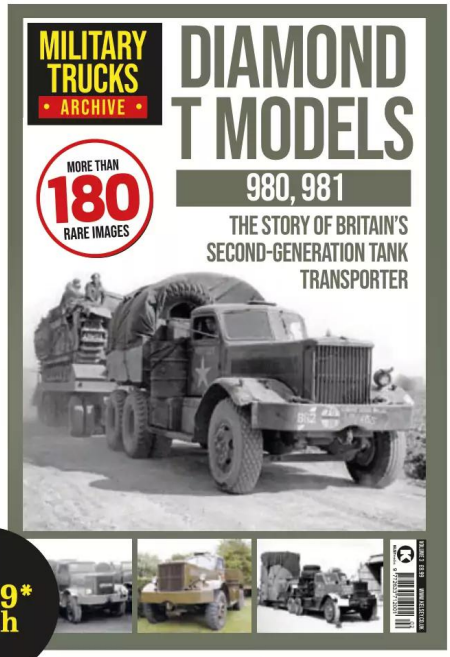

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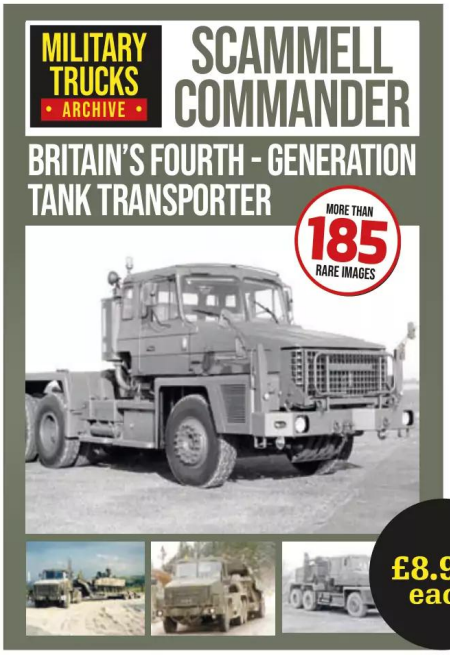

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MILITARY TRUCKS ARCHIVE

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OSHKOSH M1070 SERIES

● Posing against a stormy sky, this M1070F wears its civilian number plate. The load is an Augusta Westland Apache AH1 attack helicopter, a licence-built version of the Boeing Apache AH-64D Longbow attack helicopter, weighing just 11,387 lb (5165kg).

Compiled and written by Pat Ware with source material and illustrations from the Warehouse Archive; other photographs as credited.

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INTRODUCTION

Oshkosh steals a march!

It is almost 90 years since Scammell supplied the first tank transporter to the British Army, a 16/18-ton tractor and semi-trailer based on the company's innovative Pioneer which had been introduced in 1928. Notwithstanding a skirmish with the woefully-inadequate Albion WD.CX24 in 1942, Scammell remained the sole British supplier of heavy tank transporters throughout WW2, albeit the majority of the tank transporters of this period were the Models 980 and 981 of the American Diamond T Motor Car Company. In 1951 the Diamond T started to be usurped by the Thornycroft Antar, with the last of the American tractors leaving service in the 'seventies. But, by the mid-sixties, the Antar was already beginning to show its age and Thornycroft believed that they would get another crack of the whip with what was originally described as the Antar Mk 4. The merger with Scammell saw this evolve into the mighty Scammell Commander.

After a long and troubled gestation period, the Commander finally went into service in West Germany in 1984. But it was in the Middle East where it was able to prove itself and yet at the same time, the harsh desert conditions that were encountered there also hastened the Commander's demise.

Despite undergoing a mid-life rebuild in 1992/93, the Ministry of Defence (MoD) started to seriously consider that it might be time for its replacement... and, also believed that it was time to try a bold new method of funding described as the 'private finance initiative', or PFI. One of the first PFI projects had been the £15 million Skye Bridge that opened in October 1995, but the funding model was also used, for example, for schools, hospitals and other transport infrastructure projects. However, this would be the first use of the private finance initiative in the defence industry.

PFI had originally been launched in 1992 by Prime Minister John Major, as part of a programme that reduced apparent government debt by keeping it 'off the balance sheet'. Although originally devised by a Conservative administration, Tony Blair's incoming Labour government in 1997 became an enthusiastic supporter of the initiative and by the end of its first term in power New Labour had signed 210 PFI contracts with a total capital value of £11.6 billion, none of which could be identified by government accountants as 'borrowing'.

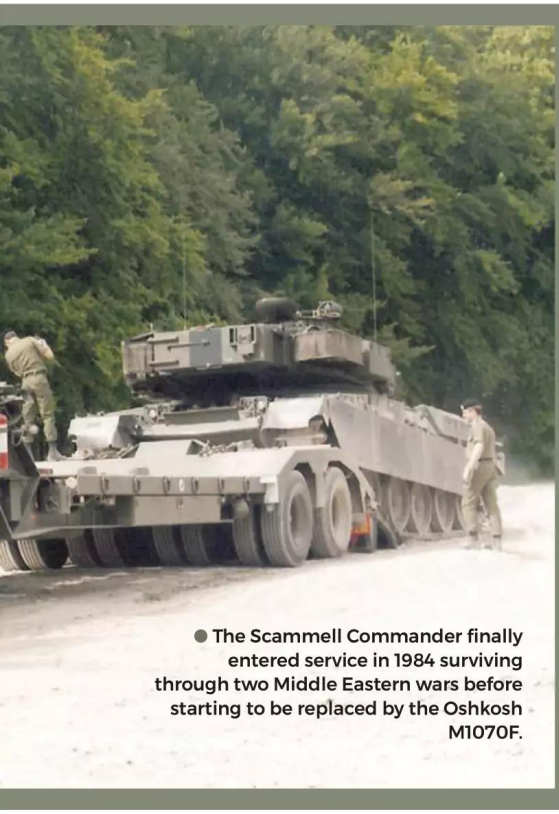
Under the PFI scheme proposed for Britain's new tank transporter, the successful contractor was required to design, build, finance, maintain and operate the vehicles for a specified period of 20 years – plus a two-year ramp-up period – in return for fees paid annually by the government. The vehicles concerned would remain the property of the contractor, who was also responsible for employing fully-trained sponsored reservists who would operate alongside regular army personnel.

In 1998, the MoD issued invitations to an initial seven interested parties to submit outline proposals for the replacement of the Commander. These included Econofreight, Multidrive, and Lex Service; there were consortia headed by Mercedes-Benz, Serco with MAN Truck and Bus, and Alvis-Unipower; and, finally, a joint venture company comprising Halliburton Brown & Root and Oshkosh, operating as Fasttrax. The contract originally called for the provision of 120 transporters

● The original Oshkosh M1070 entered service with the US Army in July 1992, remaining in service until superseded by the 'A1' variant in 2010. *(US Department of Defense)*

● Based on the earlier M1070E1 and developed especially for the British Army, the M1070F was designed for use with a King 70.7 ton (72 tonne) semi-trailer and started to enter service in 2003. *(Shaun Connors)*

● M1070F carrying a 25 ton (25.4 tonne) Warrior infantry fighting vehicle manufactured by GKN-Sankey. *(Crown copyright)*



● The Scammell Commander finally entered service in 1984 surviving through two Middle Eastern wars before starting to be replaced by the Oshkosh M1070F.

● There's no denying that this thing has considerable presence. *(Ian Young)*

and semi-trailers, although this was subsequently cut to 92 with an option for the additional 28, which was never exercised.

Econofreight and Multidrive pulled out without completing the paperwork, but the remaining consortia submitted outline proposals in early 1998, by which time, just two companies remained in contention... Alvis-Unipower, with their innovative MH-8875 tractor, combined with a 12-wheeled Nicolas semi-trailer, and Fasttrax, who were proposing an upgraded and more powerful version of the US Army's Oshkosh M1070 tractor, together with a British-designed King seven-axle semi-trailer. In December 2001 it was announced that the contract had been awarded to Fasttrax, via a near £300-million whole-life contract. Deliveries of the Oshkosh M1070F started in 2003, with the new vehicles issued to tank-transporter squadrons from July 2004, and the M1070F was 'blooded' in Afghanistan and Iraq in 2008.

● Near-new M1070F, displaying civilian number plates, with a Warrior infantry fighting vehicle being prepared for loading. *(Crown copyright)*

● The 80-ton M1000 was the standard semi-trailer for both the M1070 and the much improved M1070A1. *(US Department of Defense)*

● The M1070A1 remained in production from 2010 until August 2014, although it differed in many details from the original M1070. The engine compartment cover, in particular, was redesigned to accommodate the Caterpillar engine rather than the original Detroit Diesel. The front bumper was also reshaped and there were also new axles and an anti-skid braking system (ABS). *(US Department of Defense)*

And although this work is ostensibly the story of the M1070F, it is, at least in part, also the story of the whole M1070 family, including the original 'A0' variant, the 'A1', the 'E1', and the so-called 'Global HET'... as well as the Alvis-Unipower MH-8875.

ABOUT THE AUTHOR

Pat Ware has been a professional writer for more than 50 years. He is the author of more than 60 vehicle-related titles, and has specialised in military-vehicle subjects since 1995. His expertise is recognised worldwide, and his books have been translated into a half-dozen languages. This title is the fifth in the 'Military Vehicles Archive' series, now covering all five generations of British tank transporter.

In 2001, he was the founding editor of the UK's leading military-vehicle magazine, '*Classic Military Vehicle*', and he continues to contribute to respected military-vehicle journals in the USA and France. In 2015 he contributed to a 10-part TV show, '*War on Wheels*', for China Central Television.

His eclectic interests have also led to the publication of titles on subjects as diverse as the Cold War, commercial haulage, and iconic agricultural tractors.

FIVE GENERATIONS!

Tank transporting in the 21st Century

The role of the tank transporter has scarcely changed in the near-100 years since HC Bauly, a steam wagon repair company based in Bow, East London, attached a semi-trailer to a modified AEC Model K truck via a turntable mechanism, and used it to move a Holt caterpillar tractor. However, the outfit was not very effective on loose surfaces, and was barely large enough to accommodate the tanks of the period. Transportation continued to be largely by rail. Within little more than ten years HC Bauly had gone into voluntary liquidation, but, nevertheless, the advantages of moving tracked vehicles on specialist transporters, which offered higher speed, improved fuel consumption and less mechanical wear, were quickly established... if only a sufficiently powerful prime mover could be developed.

Scammell's Pioneer appeared in tank-transporter form in 1932 and was certainly capable of dealing with the then-standard 12-ton British Vickers medium tank, but the Army showed little interest until 1937 when the Pioneer was upgraded to 20 tons. Even then, the numbers of vehicles ordered were relatively low. A year later, the Pioneer was further upgraded, this time to 30 tons and, although the orders started to flow, the numbers being produced were never sufficient and, anyway, the Pioneer was not capable of handling the increasingly-heavy tanks of the period. By 1942, the Pioneer had been superseded by the American-built Diamond T which was rated at 40 tons. The Pioneer remained in service until the end of the war, but it was the Diamond T that made it into the post-war years, eventually giving way to the Thornycroft Antar and then, in 1984, to the Scammell Commander.

By the time the Commander was due for renewal, a number of valuable lessons had been learned regarding the operation of tank transporters in the Middle East. The ability to double-up on lighter loads was seen as increasingly important, whilst the provision of a sleeper cab allowed double-crewing, and meant that trucks could be operated almost around the clock. The lack of off-road performance did not prove to be quite as important as had been anticipated but, nevertheless, it was believed that any future transporter should incorporate all-wheel drive as a matter of course.

● Oshkosh M1070F complete with seven-axle King GTS 100/7 semi-trailer. The outfit measures up at 922in (23,400mm) in length, with an overall width of 114in (2890mm). *(Fasttrax)*

● Making its first appearance in 1941, the Diamond T Model 980, and the later 981, gave almost 35 years of service with the British Army. The original Hercules DFXE diesel engine was replaced by a Rolls-Royce C6 in the mid-fifties.

● Despite a handful of examples remaining in service until 1974, the Diamond T started to be replaced by the Thornycroft Antar, seen here in Mk 1 ballast-bodied configuration, in 1951. Unlike the Diamond T, the Antar Mks 1 and 2 were powered by a petrol engine.

● The Rolls-Royce diesel-engined Antar Mk 3 appeared in 1958 and served with BAOR until January 1985, when it was finally replaced by the Scammell Commander.

But who was available to build such a machine?

Unfortunately, the British heavy truck industry was largely moribund. Rotinoff had shut up shop at the end of the 'fifties, with the name passing to Atkinson, but with very little to show for it. The AWD-Bedford TT tank transporter had never passed beyond the concept stage and the company eventually closed down four years later, in 1992. Thornycroft had been absorbed into Scammell back in 1971 and although Scammell had been the supplier of the Army's current transporter, the Commander, the company no longer existed. Commercial interests in Scammell's military vehicles had passed to Unipower – later to become Alvis-Unipower – in 1988. And, finally, there was Foden. Although the company had been purchased by Paccar in 1980, Foden survived by virtue of being in receipt of large contracts for military vehicles, including most recently, the DROPS IMMLC (improved

medium mobility load carrier) trucks and a heavy recovery vehicle. However, Foden had no experience of building a tank transporter.

Clearly, if there was to be a proper competition for Britain's fifth-generation of tank transporter, then it was going to have to be international. What's more, with the government's proposed private leasing arrangements, this competition was going to be almost as much about contract and finance arrangements as it was about engineering.

● Based on the US Army's M1070, but now powered by a Caterpillar straight-six rather than the original Detroit Diesel V8, the M1070F, seen here in prototype form coupled to a King six-axle semi-trailer.

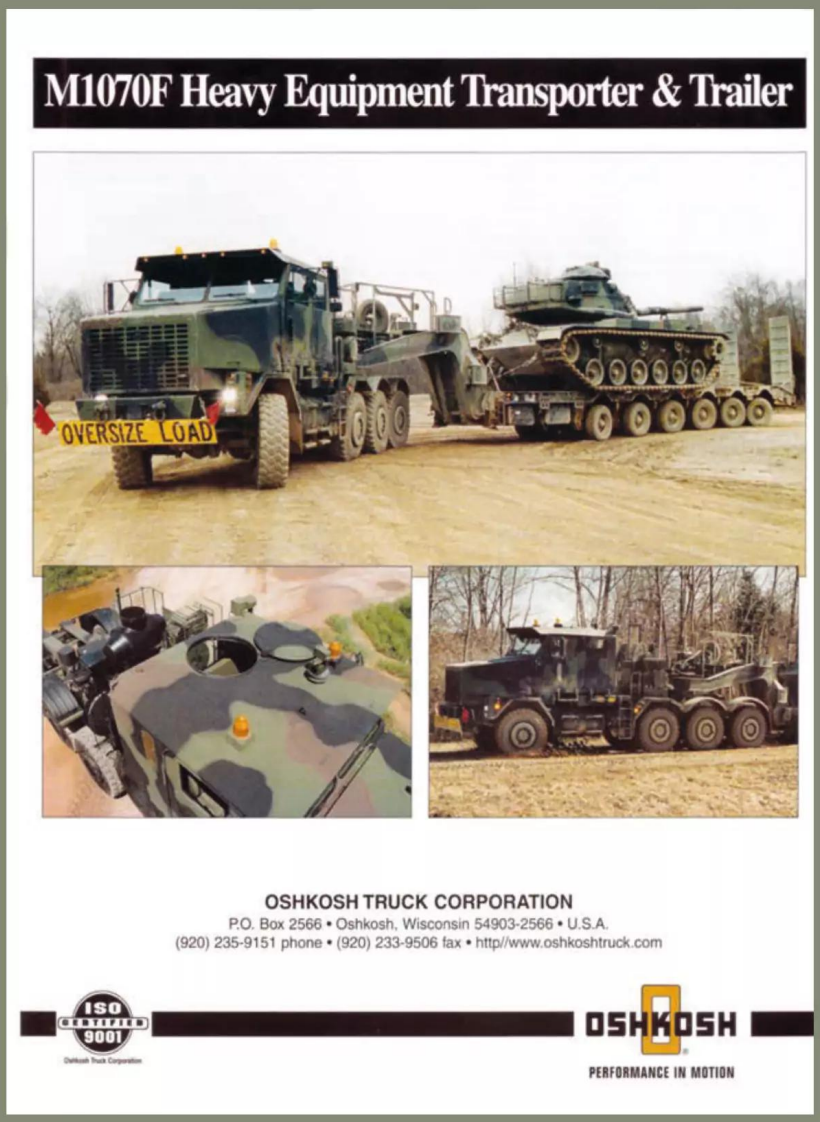
Private finance initiative

The first thing to understand is that although the government of the day wanted its fleet of shiny new tank transporters – or heavy equipment transporters (HET) as it had become fashionable to describe them – it didn't necessarily want to pay for them... well, not all at once. The contract was to be the subject of a so-called 'private finance initiative' – or PFI – which is effectively an accountant's sleight of hand that provides the means to pay for something over an extended contract period, whilst at the same time keeping the total sums of money involved off the balance sheet.

PFI was a British government procurement policy that was originally launched by John Major's Conservatives in 1992, but which was enthusiastically endorsed by the incoming Labour administration formed under Tony Blair in 1997. The aim was to create public-private partnerships by allowing private firms to undertake to complete and manage public projects. In other words using private-sector money to provide services in the public sector and rewarding the contractors for their performance over a defined period of time. Whether or not you would agree that it was a good idea depends on your views regarding appropriate levels of government borrowing and spending... but critics claimed that it simply allowed the government to hide the true amount of debt.

In February 1998, John Spellar, the Parliamentary Under-Secretary of State at the Ministry of Defence announced that the MoD was exploring the scope for the private sector to 'provide a transport service for tanks and other heavy armoured vehicles to support the Army's front line'... in other words, the government was considering a PFI scheme for the Commander's replacement. Although the Army was to retain responsibility for the military

● The Scammell Commander was almost 16 years in development, finally entering service in 1984. It went on to clock-up almost 20 years, before it was announced, in 2001, that it would be replaced by the Oshkosh M1070F.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● Oshkosh produced this leaflet to promote the M1070F in September 2001.

capability of the vehicles, any risks arising in the development, procurement and management chain were to be genuinely transferred to the private sector.

Described as both 'exciting' and 'trailblazing', this was the first time that such a scheme had been used in a 'front-line' operation.

The PFI scheme that was proposed for the HET project asked the successful contractor to finance, design, build, maintain, own and operate a fleet of 92 vehicles and trailers, and to undertake related training, both of private, ie contractor-employed, and military personnel. As an aside, the contractor was precluded from using the vehicles to generate third-party revenue, and, until 2011, there was a lower weight limit on moves that precluded the carrying of vehicles such as the Force Protection Mastiff and Wolfhound armoured trucks, and the Warrior infantry fighting vehicle.

One third of the crews that would operate the HET were to be sponsored reservists, employed and financed by the PFI contractor, but transferred to military command during periods of conflict. Operating a total of 30 of the HET vehicles, the reservists were spread across the (then) three tank-transporter squadrons.

● The change of engine from the Detroit Diesel V8 to the six-cylinder Caterpillar necessitated that the M1070F had a longer engine compartment. Compare the front of this US Army M1070 with the prototype M1070F.

The competing bidders

In December 1997, seven consortia indicated an interest in the project and were issued with the necessary documents to complete their bids:

- A consortium headed by Mercedes-Benz (UK) Limited.
- A consortium of Alvis-Unipower Limited, Ryder Defence PLC, PHH Vehicle Management Services PLC, and J Henry Schroder Limited, operating under the name Tactacon – or Tactical Transport Assets Consortium.
- A consortium of Lex Service PLC, Foden Trucks Division of Paccar UK Limited, and Broshuis Trailers Limited, operating as Hammer.
- A consortium of Serco PLC and MAN Truck & Bus (UK) Limited operating as Defence Heavy Transport Limited.
- A joint venture consisting of Halliburton Brown & Root Services, 3i Infrastructure and Oshkosh Defense LLC, operating under the name Fasttrax Limited.
- Econofreight Heavy Transport Limited (now ALE-Econofreight Limited).
- Multidrive Limited.

● Based on the Alvis-Unipower 8x8 bridging vehicle, the MH-8875 was the other contender for the contract. With its low cab-forward stance it was a completely different approach to that adopted by Oshkosh.

Econofreight, Multidrive and Mercedes-Benz withdrew from the competition without submitting the finished bid documents, and by the end of 1998 an MoD press release indicated that the competition was reduced to four companies – Serco-MAN, Lex Service, Alvis-Unipower and Fasttrax, but, eventually just two companies remained in contention – Tactacon and Fasttrax.

In essence, the Tactacon consortium was to be funded by Schroders who would buy the trucks from Alvis-Unipower, whilst the trucks would be operated by Ryder Defence and managed by the American fleet-management company, PHH Vehicle Management Services. There was much management speak in the literature accompanying the bid, try this sentence

● Prototype M1070F, coupled to a King six-axle semi-trailer, onto which has been loaded an obsolete US Army M60 medium tank.

● The production M1070F had a more-rounded engine compartment cover than the prototype, combined with a curved front bumper. The rear doors to the cab have been eliminated.

for size... 'Tactacon is exclusively focused on the provision and operation of purpose-engineered heavy non-combat tactical support vehicles on the basis of private/public partnership arrangements', or how about 'Tactacon can provide well-informed insight into the structuring and functioning of effective private/public partnership arrangements and could assist with the preparation of financial appraisals in advance of the tendering process'!

So far, so clear... but is anyone really impressed by this stuff?

Although doubtless equally heavy on the management jargon, the Fasttrax consortium was slightly more straightforward. The consortium was led by Halliburton Brown & Root Services in conjunction with the private-equity company 3i Infrastructure, with each of the two major partners owning 50% of the joint venture. The trucks were to be purchased from Oshkosh by 3i Infrastructure (later to be replaced by Deutsche Bank) and operated under sub-contract by FTX Logistics, the latter a wholly-owned subsidiary of Halliburton Brown & Root. In 1997, Halliburton Brown & Root became Kellogg Brown & Root following its acquisition by Dresser Industries.

● Brand-new M1070F with the engine compartment and the cab open for inspection. Note the huge twin winches between the cab and the fifth wheel. *(Fasttrax)*

● On display! M1070F photographed at a military exhibition. Note how the trailer bed has been raised and the forward pairs of wheels have been lifted well clear of the ground. *(Ian Young)*

Oshkosh and Unipower slug it out

Up to this point, this had been largely a paper exercise, but now the two remaining companies were asked to produce one prototype each, in both cases, based on existing tractors. Over a near two-year period, encompassing 1998, 1999 and 2000, the Alvis-Unipower and Oshkosh tractors were put through their paces under the watchful eye of the Defence Equipment Research Agency (DERA) and the Army.

The Oshkosh had the advantage of being based on an existing and well-proven vehicle and one that had already clocked up thousands of miles of service with the US Army. However, where the US Army's version of the M1070 was powered by a Detroit Diesel engine, the version that was put forward to the MoD had a Caterpillar C18, which necessitated an extension to the nose of the vehicle to accommodate the extra length of the engine. Other major changes included the substitution of a seven-speed Allison HD-4076P transmission in place of the five-speed CLT-754, and an Oshkosh 30000 transfer case rather than the Oshkosh 55000 used in the US Army's truck. In most other respects the vehicle followed the original. Shoreham-based Ricardo Defence Limited were contracted to

● Near-new M1070F and semi-trailer posing under a gloomy sky.

● M1070F with rooftop weapon station. The truck has also been equipped with additional armoured protection in the form of stand-off bar armour around the cab, and composite armour on the doors. There is also electronic protection against improvised explosive devices. *(Shaun Connors)*

'Europeanise' the vehicles, ensuring that they were able to meet with existing and future environmental legislation, including emissions controls and axle loadings. The semi-trailer selected for production was a seven-axle, 28-wheeled King GTS110/7 with a capacity of 71 tons (72 tonne), but, for at least some of the trials programme, the tractor could be found towing both five- and six-axle versions of the King semi-trailer.

Apparently dubbed 'Hannibal' after the Carthaginian general who led his elephants across the Alps in 218BC, Alvis-Unipower's MH-8875 was a different matter... and the company is on record as saying that it believed it could sell 1400 of these vehicles over a five-year period bringing in £700 million. The press made much of the size of the engine and the fact that it was fitted with 'the largest automatic gearbox ever used on a road vehicle', not to mention that the truck's hydraulic suspension enabled it to cross rough terrain with ease, and to effectively 'duck under' low bridges.

Although it was a short-wheelbase development of an existing 8x8 bridging vehicle in the Unipower 'M Series', dating back to 1992, it was effectively unproven for the tank-transporter role. The development team spent weeks at DERA's Chertsey test track trying to

● Running on trade plates, this pair of M1070F tractors were photographed during delivery. *(Phil Moth)*

● A pair of M1070F tractors, photographed at Sandhurst in September 2020. *(Phil Moth)*

● There's no denying that this truck has considerable presence... regardless of the angle. *(Shaun Connors)*

iron out the inevitable engineering and design glitches. Alvis-Unipower were working with the French company, Nicolas Industrie, and, during these trials, the chosen semi-trailer was a six-axle 24-wheeled Nicolas unit with a capacity of 73.6 tons (75 tonne).

Oshkosh prevails

For a period, the Alvis-Unipower team was confident that, not only was their vehicle superior to the somewhat conventional M1070F, but that being British gave them an extra edge; although for its part, the government was adamant that politics would play no part in the decision-making process. It had originally been stated that a decision would be reached in early 2000, but it must have come as something of a blow to Alvis-Unipower in January 2001, almost a year later, when it was announced that Fasttrax had been nominated as the successful bidder.

● One of just 92 vehicles, the last M1070F rolled off the production line in Wisconsin in 2003. *(Oshkosh via Shaun Connors)*

FIVE GENERATIONS!

Subject to finalising the small print of the contract, 92 vehicles, and 89 semi-trailers, would be supplied to the MoD by October 2003, with an option on a further 28; the option expired in June 2003 without being exercised. Three of the 92 tractors were equipped with the Tru-Hitch hydraulic recovery system mounted on the fifth wheel, two tractors were destined for training, and three were allocated to war maintenance reserve stock.

The trucks were to be manufactured in Wisconsin, although a certain amount of the systems integration work was completed by Ricardo Defence Limited. A House of Commons document dated July 2002 detailed the capital value of the HET project at £93 million, whilst the 20-year through-life costs were estimated at almost £300 million with about 75% of the contract by value being placed with British companies. The contract value to Oshkosh, including sub-contracting the trailers to King, was initially something like £48 million giving a price per tractor/trailer unit of around £500,000. This compares very favourably with the purchase price for Scammell Commanders in 1982/83 of £218,000 each.

The Defence Procurement Minister, Lord Bach, is on record as saying that 'these tank transporters will be the biggest and best in the world, capable of operating on- or off-road over harsh terrain... we have real innovation here: this is the first time that PFI has been used to support directly front-line activities and these principles will be applied to other equipment projects'.

Notwithstanding the Minister's excitement, it was to be 14 December 2001, almost another year before the HET contract was signed between the MoD and Fasttrax Limited. Allowing for

a 2.5 year start-up period followed by 20 years of full service, this means that the contract ends in 2023.

It is not yet clear what will happen after that date, although a number of 'modified light equipment transporters' (MLET) have been purchased to supplement the M1070F, expressly for transporting the tracked Ajax armoured fighting vehicle – formerly known as the Scout specialist vehicle. It could be construed that this demonstrates a lack of future commitment to the HET... although, at present, there are no other vehicles capable of transporting the Challenger.

● More closely resembling the M1070F, the original M1070 was superseded by the Caterpillar-powered 'A1' variant in 2012. *(Oshkosh)*

OSH WHAT?

Never heard of Oshkosh... you're not alone!

The name of Oshkosh is not exactly well-known in Britain, despite its increasing significance to the British Army. Over the last 20 years, the company has become the chosen supplier for the M1070F tank transporter, as well as the wheeled tanker truck which forms a component of the medium vehicle tactical replacement (MVTR) programme. And in 2017 the government announced that Britain was considering purchase of the Oshkosh joint light tactical vehicle (JLTV) and had initiated a trials programme in April 2019 that was scheduled to end in 2021.

So, just who are Oshkosh? Taking its name from Chief Oshkosh of the Native-American Menominee tribe, whose people still live on their traditional native lands to this day, the Oshkosh Motor Truck Manufacturing Company can trace its origins back to 1917. The company was originally established by Bernhard A Mosling and William R Besserdich as the Wisconsin Duplex Auto Company.

● Dating from 1917, and proudly displayed at the company's Wisconsin Global Headquarters building, 'Old Betsy' was the first truck produced by Oshkosh... rated for a 1-ton payload, and with all-wheel drive. *(Oshkosh)*

● The mighty M1070F tractor in all its glory! *(Shaun Connors)*

● The Oshkosh Model TR four-wheel drive, four-wheel steer earth-mover was trialled by the US Army in 1933 as a possible tractor for the 155mm gun. A special gooseneck allowed the gun trail to be coupled to the tractor.

● Oshkosh WT-2206 ballast-bodied snow-clearance tractor without the front-mounted plough.

● Oshkosh HB-2518-MP3 4x4 airport runway snow blower. *(US Department of Defense)*

Besserdich had earlier helped to set up the Four Wheel Drive Auto Company – better known as FWD – in Clintonville, Wisconsin building all-wheel drive trucks. Oshkosh's first truck, nicknamed 'Old Betsy', and still proudly displayed in the company's new Global Headquarters building, was rated at 1 ton and was powered by a LeRoi engine driving through a three-speed transmission. In 1918, the company introduced the $3500 2-ton Model A, which incorporated all-wheel drive together with an automatic positive-locking centre differential.

In 1921, Oshkosh moved to a new factory site which it has now occupied for 100 years. The first vehicle into production after the move was the Model B, a 2-ton truck that was later upgraded to 3.5 tons; this was followed by the 5-ton Model F. Despite the company's proud boast that the 'Oshkosh truck goes anywhere the wheels can touch the ground', sales were severely hampered by the fact that the US government had thousands of military-surplus FWD all-wheel drive trucks that were practically being given away.

Sales eventually recovered until the Great Depression of 1929/30 forced the company into a reorganisation.

Oshkosh's first possible foray into the defence market came in 1933 when the tractor component of the Model TR earth-mover was evaluated by the US Army at Aberdeen Proving Ground as a possible tractor to haul the 60,000 lb (27,272kg) weight of the 155mm gun or 8in howitzer.

Despite the vehicle offering both four-wheel drive and four-wheel steering, the military authorities decided that it offered too high a profile, and that the pneumatic tyres, which were a first on an earth-mover, were likely to be too vulnerable to punctures. It was to be another seven years before any Oshkosh trucks saw military service, but 988 examples of the W700, a part of the company's W Series that had been introduced in 1940, were purchased by the US Army Corps of Engineers for use as a snow blower.

In 1945 Oshkosh was awarded the coveted 'Army and Navy Excellence in Wartime' award, also known as the 'E award'.

The W Series remained in production for 20 years, and was also used as

● In 1981, Oshkosh started to receive contracts for the 'heavy expanded mobility tactical truck' (HEMTT). This is the tanker variant. *(Oshkosh)*

● Oshkosh has received several contracts for the so-called 'joint light tactical vehicle' (JLTV), intended to partially replace the HMMWV. *(Oshkosh)*

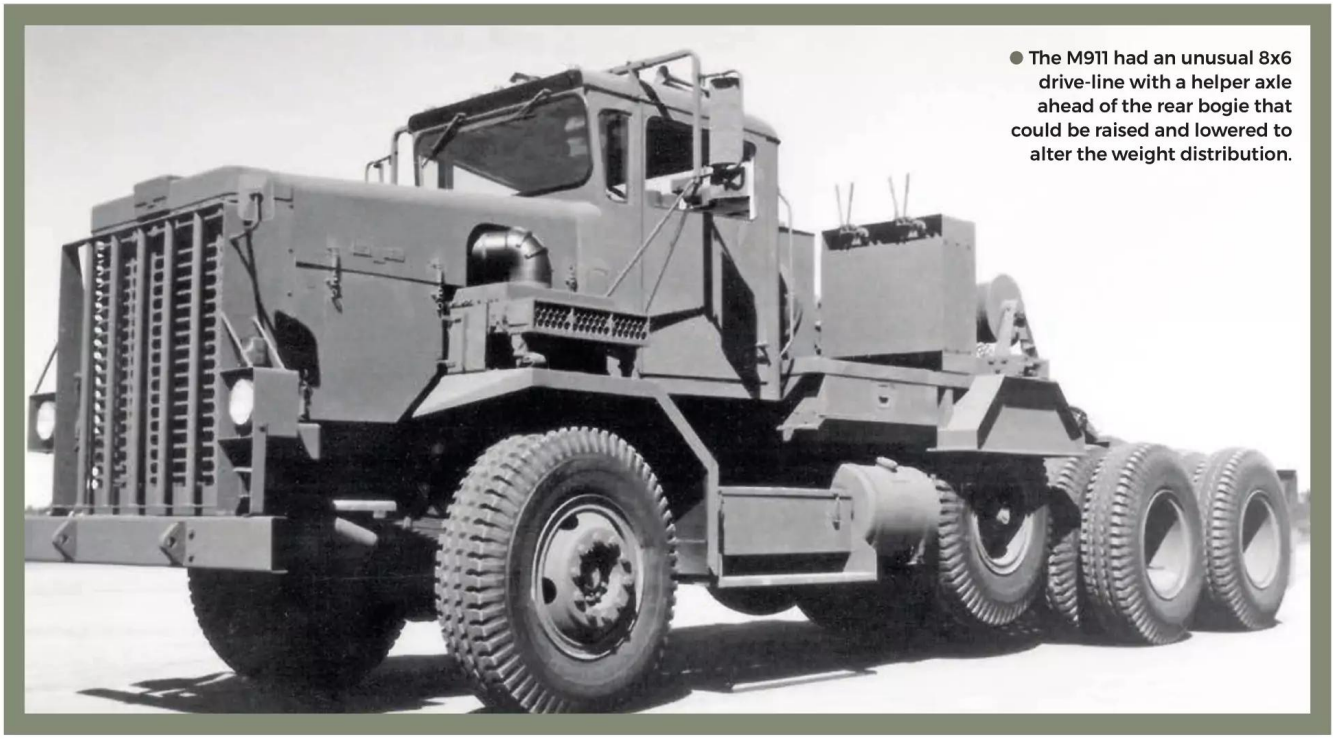
● The predecessor of the M1070 was the Oshkosh M911, a heavy tractor based on commercial components and designed to be used with the 60-short ton (54.5 tonne) M747 semi-trailer.

the basis for an airfield rescue and fire-fighting (ARFF) vehicle for the US Coastguard in 1953. By 1960, the old W Series snow blowers had been superseded by the much improved high-speed WT-2206, large numbers of which were supplied to Strategic Air Command in order to help maintain the airfields associated with the Distant Early Warning (DEW) radar chain, and these, in turn were superseded by the H Series.

In 1968, Oshkosh designed and built the U-30 aircraft tug, 45 of which were supplied to the US Air Force to tow the Lockheed C-5 Galaxy transport aircraft.

The company won a US Army contract to supply 744 M911 heavy equipment transporters (HETs) in 1976. The M911 was based on the F Series and was designed to be operated with the M747 four-axle semi-trailer. A total of 1000 of these trucks were eventually supplied, remaining in service until they were superseded by the M1070 from 1992, by which time Oshkosh Defense was well on the way to becoming the sole supplier of medium and heavy tactical trucks to the US Army and Marines.

Five years later, in 1981, Oshkosh was awarded a contract to construct what was eventually a total of 13,000 Detroit Diesel powered 'heavy expanded mobility tactical trucks' (HEMTTs). Five variants were produced, each with an 8x8 drive-line, two with cargo bodies, one tanker, a prime mover,



● The M911 had an unusual 8x6 drive-line with a helper axle ahead of the rear bogie that could be raised and lowered to alter the weight distribution.

● Specification leaflet for the M911 tractor.

● Oshkosh M1070 tractor in three-colour camouflage, coupled to the M1000 semi-trailer.

and a recovery vehicle. From the early 'eighties, Oshkosh also assumed responsibility for manufacturing the Lockheed Model 901 'Dragon Wagon', an 8x8 off-road vehicle that was manufactured in three versions, to suit payloads of 15, 25 and 35 tons. This, in turn, led to the development of the LVS – logistics vehicle system – a family of articulated 8x8 all-terrain vehicles developed for the US Marine Corps in which the front power unit could be used with a range of five different rear load-carrying units.

In July 1992, the Oshkosh Truck Corporation, now operating as Oshkosh Defense, was asked to meet a US Army requirement for a state-of-the-art multi-wheeled heavy equipment transporter (HET) which would be able to carry the M1 Abrams main battle tank. Oshkosh proposed the M1070, a Detroit Diesel powered truck with full-time all-wheel drive and four-wheel steering, in combination with the M1000 80-ton semi-trailer. An initial contract was placed for 1044 M1070 tractors, with production commencing in July 1992.

● Designed for use on primary, secondary and unimproved roads, the M1070 was capable of a maximum speed of 45mph (73km/h).

● The standard power unit for the M1070 was the Detroit Diesel 8V-92TA, a turbocharged V8 engine producing 500bhp (373kW) from a capacity of 12,100cc (738in³).

The contract included an option for 522 additional units and, by the time production ended in March 2003, a total of 2488 examples had been supplied to the US Army. The improved, Caterpillar-powered M1070A1 was introduced in 2010 with production for the US Army continuing until August 2014; the 'A1' variant remains in production for Jordan, Oman and Egypt.

The year 1999 saw the first examples of the US Marines' 6x6 medium tactical vehicle replacement (MTVR) programme, with almost 7000 vehicles delivered by the time the five-year programme came to an end. Nominally rated at 4.91 tons (5 tonne), there were originally four MTVR variants, but, by 2001 the number had expanded to seven and then nine, with all of the vehicles sharing a common chassis. A variation of the tractor component also serves to provide motive power for the three variants of the British Army's wheeled tanker fleet, consisting of a tactical aircraft refueller, close-support fuel tanker, and close-support water tanker.

● Hauling an Abrams M1 main battle tank across the sands of Kuwait. *(US Department of Defense)*

Essentially the same tractor was also proposed for the British Army's future light equipment transporter (FLET).

Meanwhile, the company had continued to grow, embarking upon an ambitious programme of acquisition, with the first move being the purchase of Pierce Manufacturing in 1996. Based in Appleton, Wisconsin, Pierce is a leading manufacturer of custom fire and rescue apparatus. Over the next decade several more companies were acquired in the heavy-duty vehicle and access equipment industry and, today, the Oshkosh Corporation is organised into four primary business groups comprising defence, fire and emergency, access equipment, and commercial, with manufacturing plants located across the globe. By 2013, the company had

● Whilst not exactly handsome, the truck has an undeniable brutal charm! *(US Department of Defense)*

● The right-hand semi-trailer carries an M2 Bradley infantry fighting vehicle, whilst the load on the left-hand tractor is an M1 Abrams main battle tank. During the Gulf War, Bradleys destroyed more Iraqi armoured vehicles than the Abrams. *(US Department of Defense)*

● M1070 and M1000 transporter train carrying a 'heavy expanded mobility tactical truck' (HEMTT) cargo variant. *(US Department of Defense)*

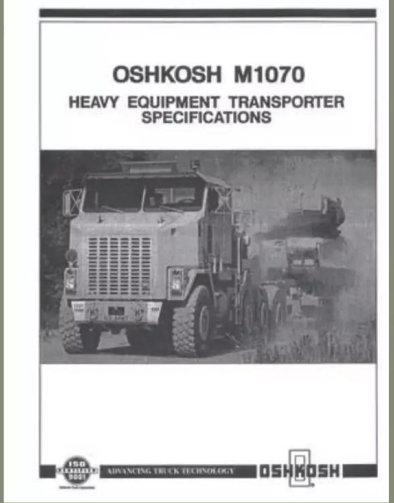
● The M1070 is capable of operating in temperatures down to -26˚F (-32˚C). *(US Department of Defense)*

supplied more than 100,000 military vehicles and in 2019 celebrated its centenary.

In January 2001, the British MoD announced that the M1070F, a Caterpillar-powered uprated version of the, already uprated, M1070E1, had been chosen as the fifth-generation tank transporter for the British Army, in conjunction with a locally-produced seven-axle King semi-trailer. This was the first UK defence contract for the company and a subsidiary, named Oshkosh Truck UK Limited, was established at Bristol Business Park, close to the MoD defence procurement office at Abbey Wood.

Finally, there was the so-called 'Global HET', a lower-cost 6x6 tractor based on the M1070A1 that was announced in 2008. An initial order of 20 vehicles, destined for the United Arab Emirates, was placed in 2011, to be used as a tractor for the locally-developed Jobaria multiple launch rocket system (MLRS).

Oshkosh continues to exercise its dominance of the upper end of the US military-vehicle market. On 25 August 2015, the company was awarded the first of what will be several contracts for the so-called 'joint light tactical vehicle' (JLTV) contract, intended to partially replace the AM General HMMWV – or 'Humvee'. This initial JLTV award is valued at $6.75 billion for a maximum of 16,901 vehicles, but the procurement objective for the vehicle is for 54,599 vehicles – with 49,099 intended for the US Army and 5500 for the US Marines – and the estimated cost of the complete



● Oshkosh specification leaflet for the M1070, dated 1996.

● M1070F tractor with stand-off bar armour, composite ballistic panels over the doors, and electronic detection equipment for improvised explosive devices (IED).

● Although three of the British Army's 92 M1070F tractors have been equipped with the Tru-Hitch FWTRD hydraulic towing and recovery device capable of handling the tractor and the King semi-trailer, of course, it is perfectly possible to load a disabled tractor onto the semi-trailer. *(Crown copyright)*

● A pair of muddy M1070F tractors with Permali lightweight ballistic armour panels to the doors and cab sides, and wire protection over the glazed areas. *(Carl Schulze)*

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● Production of the M1070A1 started in December 2010. The major change was the replacement of the V8 Detroit Diesel engine with a Caterpillar C18, and the use of a seven-speed Allison transmission. Note the huge lifting rings protruding through the bonnet. *(US Department of Defense)*

● M1070A1 showing the changes to the front bumper, the lighting arrangements and the engine compartment cover. *(Oshkosh)*

programme is a staggering $47.6 billion.In February 2020, the Oshkosh Corporation was named one of the 'World's Most Ethical Companies' by the Arizona-based Ethisphere Institute.

M911

In September 1976, following a review of the developmental XM911, Oshkosh was awarded a contract for 774 M911 heavy equipment transporters. The USA must have been going through a period of budgetary restraint because one of the demands of the bid for the M911 was that the vehicle be based on a commercial truck in order to keep costs down. In this case, Oshkosh derived the M911 from either the F-2635 or the J-2065, according to which sources are consulted. A big, bluff monster of a truck, it was intended to replace a ragbag of older vehicles, including the Mack-designed M123A1C, dating from the mid-sixties and constructed

● The contrast of the personnel with the tractor, indicates the sheer size of the vehicle... the top of the cab is 130in (3302mm) from the ground. *(US Department of Defense)*

by the Consolidated Diesel Electric Corporation (Condec) of Old Greenwich, Connecticut, and the Ward LaFrance M746 which had originally been developed by the Chrysler Corporation.

The M911 was powered by the Detroit Diesel 8V-92TA, a turbocharged V8 engine, producing 435bhp (324kW) at 2100rpm from a displacement of 12,100cc (738in³), driving three axles via a five-speed automatic Allison CLBT-754 transmission, single-speed Oshkosh transfer case, and a Fuller two-speed auxiliary transmission. The drive-line was unusually configured as 8x6, with a helper axle ahead of the rear bogie that could be raised and lowered by air pressure to improve weight distribution; this feature was omitted from most examples of the vehicles that were supplied to other nations. The standard semi-trailer was the 60-ton M747, a four-axle swan-necked design produced by Condec, in which the forward axle pairs were provided with walking-beam suspension, whilst the two rear axles had adjustable air suspension. A typical load was the M60 Patton main battle

● Loading is normally achieved via the ramps! *(US Department of Defense)*

● M1070A1 complete with Abrams main battle tank on the M1000 semi-trailer. *(Oshkosh)*

● The first M1070A1 variant was issued to the 180th Transportation Motor Pool on 16 April 2012. *(US Department of Defense)*

tank, which weighed in at around 49-50 (long) tons (40.7-50.9 tonne), according to specification.

A powerful and impressive machine, the M911 was capable of a maximum road speed, when loaded, of 45mph (73km/h), and was required to be able to stop and restart on a 20% grade. Twin 45,000 lb (20.5 tonne) hydraulic winches were mounted behind the cab, with an adjacent control station... at this time, the US Army favoured loading all armoured fighting vehicles by means of the winch since this was considered to be both safer and more accurate.

The total number of vehicles produced between 1976 and 1992 was 1722.

M1070

The Oshkosh M1070 went into production in 1992, as a replacement for the M911, and was intended primarily as a transporter for the 72-ton (65.5 tonne) Abrams M1A1 main battle tank. It was designed to be used in conjunction with the five-axle 40-wheeled M1000 semi-trailer, produced by DRS Technologies Inc.

Power was provided by the same type of Detroit Diesel 8V-92TA turbocharged V8 engine as had been specified for the M911, albeit now producing some 500bhp (373kW) from a displacement of 12,100cc (738in³). All four axles were driven, by means of a five-speed automatic Allison CLT-754 transmission in combination with an Oshkosh 55000 two-speed transfer case, and power-assisted steering was provided on the forward and rear-most axles. The front axle was mounted on Hendrickson parabolic taper leaf springs, and there was Hendrickson-Turner air suspension at the rear. Twin 25-ton hydraulic winches were mounted behind the cab.

The all-steel, fully-enclosed cab provided accommodation for six men, including the driver, and could be fitted with the US Army's A- and B-kit *appliqué* armour.

Average speed on the road, loaded to a gross train weight of about 105 tons (107 tonne), was in the order of 45mph (72km/h).

Between 1992 and the end of production in March 2003, almost 2500 examples of the M1070 were supplied to the US Army. From 2004, some 1009 tractors were stripped and rebuilt to as-new standard by Oshkosh at a cost of about 75% of that for a new vehicle.

HEAVY EQUIPMENT TRANSPORTER
HET A1 | M1070A1
OSHKOSH
DEFENSE
Keep Pace With Rapidly Moving Forces.
Oshkosh Defense® HET A1 M1070A1
Heavy Equipment Transporter.
The Oshkosh Defense® Heavy Equipment Transporter (HET) A1 sets the benchmark in performance and mobility for transport systems. Engineered to provide responsive, rapid movement of mission-critical equipment – tanks, armored vehicles, recovery vehicles and construction equipment – the HET A1 takes command of even the harshest terrain to assure equipment gets where it needs to be, every time it needs to be there. Its 700 horsepower Caterpillar® C18 engine provides 200 more horsepower than the original HET. And a single-speed transfer case eliminates the need to stop and shift for operation on grades.
The HET A1 dramatically reduces wear and tear on heavy equipment, cuts transportation costs and reduces team member fatigue. It assures equipment and crews arrive in mission-ready condition on every mission. It is the efficient, versatile, durable, high-performing heavy equipment transporter forces can rely on to get them the equipment they need for mission success.
INNOVATION DRIVES FORWARD

● Oshkosh specification leaflet for the M1070A1, dated 2015.

● Newly-completed M1070A1 ready for delivery. *(US Department of Defense)*

M1070E1

In 1996/97, Oshkosh started work on the much-improved M1070E1 version of the M1070, launching it two years later in 1999. Major improvements included the use of a new Detroit Diesel Series 60 DDEC III supercharged two-stroke diesel engine that produced 600bhp (448kW) from its 14,000cc (854in³). The engine, which was certified by the US Environmental Protection Agency (EPA), was coupled to an Allison HD-4070-PR seven-speed automatic transmission.

The vehicle also incorporated advanced diagnostics for the chassis and running gear, anti-skid braking, and a safer more user-friendly cab. There was also a standard military SAE J1939 databus which defined how the engine control units (ECUs) communicated via the controller area network (CAN) bus.

There was no production of this version, which had been developed jointly with the US Army as a possible 'technology insertion program' (TIP), or mid-life upgrade, for the M1070. A report was prepared covering the

● M1070A1 and M1000 semi-trailer making short work of tough conditions. The load is a Bradley infantry fighting vehicle. *(Oshkosh)*

evaluation of the vehicle, which eventually provided the basis for the further-improved M1070F that was supplied to Britain in 2002.

M1070F

The M1070F – or M1070M as it was described in some early documents – was based on the M1070E1 and was developed especially for the British Army. The chassis was largely the same as the US Army's M1070, but the original Detroit Diesel engine was replaced by a 700bhp (522kW) six-cylinder turbocharged Caterpillar C18, with a capacity of 18,100cc (1105in³), and the five-speed Allison CLT-754 transmission was superseded in favour of a seven-speed automatic Allison HD-4076P unit.

The cab itself was largely the same, aside from being fitted with a roof hatch for a machine gun, but the original sheet-metal nose was extended to accommodate the six-cylinder Caterpillar engine, whilst initially leaving the headlamps and marker lights in their original positions. The cab of the prototype was also fitted with four doors, a feature which did not survive into production. Production vehicles were fitted with a more sharply raked glass-fibre composite moulded engine-compartment cover, with the lights moved to new positions on the bumper and on the cover itself; there was also some general 'tidying up' around the front bumper and in the areas beneath the doors, giving the truck a totally different frontal aspect.

Extensive testing of the prototype took place both in Britain and the USA in conjunction with a King GTS100/6 six-axle semi-trailer.

The M1070F is described in more detail from page 47.

M1070A1

Development of the M1070A1 began in 2008. In October 2010, Oshkosh announced that future M1070 deliveries to the US Army would be of the 'A1' variant, and a contract was issued for 1000 vehicles with a value of $440 million. Production started in December, and the first example was 'officially' delivered to the US Army's 96th Transportation Company on 16 August 2012. With the introduction of the 'A1' variant, the supply of which

● Winching a disabled tank on board the M1000 semi-trailer. *(US Department of Defense)*

● M1070F and M1000 trailer... the photograph appears to have been heavily 'Photoshopped'. *(Oshkosh)*

was restricted to the USA, the original became known as the M1070A0.

Visually the 'A1' can be easily recognised by its new, extended nose and wrap-around bumper, similar, but not identical, to the bumper and engine-compartment cover of the M1070F. Other changes included the use of a Caterpillar C18 engine as used in the M1070F providing 200bhp (150kW) more than the original Detroit Diesel unit. There was also a seven-speed Allison 4800SP transmission, Oshkosh 30000 transfer case, stronger Axletech 5000 Series axles front and rear, anti-lock braking system, and traction control. Top speed on the road, loaded, was increased to 50mph (81km/h), some 6mph (10km/h) faster than the original 'A0' variant.

There was also a Dana central tyre inflation system (CTIS) that allowed tyre pressures to be automatically increased, together with a number of electrical and diagnostic systems upgrades. The all-steel, fully-enclosed cab provided accommodation for six men, including the driver, with the rear seat convertible to a two-man bunk.

Production of the M1070A1 for the US Army finished in August 2014, by which time a total of 1591 vehicles had been delivered, replacing many of the original, older variants of this vehicle. The vehicle remains available for overseas' customers.

● M1070F with the US Army's Broshuis eight-axle semi-trailer; 170 of these semi-trailers were purchased in June 2019 for use on European roads. *(US Department of Defense)*

Global HET

Oshkosh announced the so-called Global HET in 2008. Powered by a Caterpillar C18 diesel engine, producing 700bhp (522kW), it was similar in specification to the M1070A1 and was designed to handle a 72 (short) ton (65.7 tonne) payload. The major difference lies in the use of a 6x6 drive-line configuration rather than the original 8x8, the fitment of oversized wheels and tyres, and the inclusion of a six-man four-door cab.

An initial order for 20 vehicles was placed by the Al Jaber Group based at Abu Dhabi in the United Arab Emirates (UAE) in February 2011 to be used in conjunction with special semi-trailers mounting the locally-developed Jobaria multiple launch rocket system (MLRS). Delivery was anticipated to be completed by early 2012.

At the end of 2020, the Global HET remains in production.

HEAVY EQUIPMENT TRANSPORTER
GLOBAL HET
OSHKOSH
DEFENSE
Rapid Readiness. Oshkosh Defense® Global Heavy Equipment Transporter (HET).
The Oshkosh Defense® Global HET is a high-performance 6x6 heavy equipment transport vehicle that offers a 70-ton (63500 kg) payload. With a 700 horsepower Caterpillar® C18 engine, Allison® 4800 SP transmission and single-speed Oshkosh 30000 Series transfer case, the Global HET can power over any type of terrain, assuring the heavy combat vehicles, equipment, tanks or self-propelled artillery systems it's transporting reach where they need to go in mission-ready condition. The standard air-conditioned cab offers enough room to comfortably sit six, as well as ample storage space.
Meeting Euro III engine compliance regulations, the Global HET is the durable, versatile solution for mission-ready vehicles, equipment and crew.
INNOVATION DRIVES FORWARD

● Announced in 2008, the M1070 'Global HET' was rated for a 72-short ton (65.7 tonne) payload, and had a simplified 6x6 drive-line. Power came from a Caterpillar C18 diesel engine. *(Oshkosh)*

● 'Queen of the desert'. M1070F carrying a relatively lightweight piece of engineers' plant on the semi-trailer. Note the combination of a sand-coloured tractor, combined with a green semi-trailer. *(US Department of Defense)*

● Unlike the original M1070 and the British Army's M1070F, the 'Global HET' had a three-door cab, designed to accommodate six men. *(Oshkosh)*

● The M1070 'Global HET' was shod with oversized wheels and tyres which improved traction, but which also necessitated a different arrangement of front mudguards. *(Oshkosh)*

THE ALVIS-UNIPOWER CONNECTION

Was the mighty MH-8875 Britain's last gasp heavy hauler?

Alvis-Unipower may have lost the competition to Oshkosh and the M1070F, but it would be churlish to omit any serious mention of the Unipower MH-8875, a handsome and innovative forward-control, mid-engined 8x8 tractor that was apparently capable of travelling at 53mph (85km/h) at a gross train weight of 115 tons (117 tonne). With a nod towards the much-lauded performance of the British Army's Scammells in the Middle East, the MH-8875 was originally dubbed the 'Desert Commander', but was eventually marketed as an integral component of what was known as the Unipower M Series, a range of high-performance, heavy-duty military vehicles.

The first M Series vehicles were the Perkins-powered 8x8 'tank bridge transporter' trucks for the Vickers modular bridge, the first contract for which was placed in 1993. Realising that the same chassis would lend itself to other applications, Unipower expanded the range to encompass a further four basic vehicles: a heavy recovery tractor; multi-role DROPS/PLS logistic support vehicle; a general-purpose chassis for cargo, tanker and other applications; and a 6x6 tank transporter or heavy equipment transporter. The vehicles all shared a common design approach, with a powerful engine mounted behind a low-profile, space-frame forward-mounted cab. Drive was carried to all of the wheels through a ZF five-speed automatic transmission and transferred to the road via big, low-profile 24R21 on/off road radial tyres, with inter-axle and cross-axle differential locks to ensure that the power was put where it was most needed.

● With its low, cab-forward stance and mid-mounted engine and transmission, the MH-8875, part of the Alvis-Unipower M Series, was a world away from the conventional thinking of the Oshkosh M1070.

In 1995, the Royal Army of Oman purchased nine 6x6 tank-transporter tractors with a payload rating of 59 tons (60 tonne). Designated MH-6660, this vehicle was designed to carry the Challenger 2 main battle tank and, although it did not comply with European axle-loading restrictions, this was hardly a consideration in the Kingdom of Oman. At the beginning of 1997 an 8x8 variant was developed which, in conjunction with a six-axle French-built trailer from Nicolas Industrie, was able to meet the restrictions on axle loadings even when carrying a 73.7 ton (75-tonne) payload.

The timing of the 8x8 transporter proved fortuitous, coinciding as it did with the MoD's requirement for a replacement for the Commander, and it was the combination of the 8x8 MH-8875 tractor and Nicolas trailer which Alvis-Unipower pitched to the Ministry of Defence as part of the Tactacon 'Tactical Transport Assets Consortium'.

The MH-8875 was an impressive and handsome vehicle with a squat, modern profile and a no-nonsense cab-forward stance which seemed to indicate the enormous power of the machine without having to resort to the apparent mass and bulk of its competitor. Where the tall, bonnetted Oshkosh harked back to the enormous tank transporters of WW2 and later, the low, purposeful MH-8875 was obviously the result of some lateral thinking. It also had the benefit of being air-portable in the Lockheed C130 transport aircraft and was inside the NATO 'B envelope' for rail transfer.

● As well as 8x8 and 6x6 heavy equipment transporters, the Alvis-Unipower M Series included an 8x8 heavy recovery vehicle, 8x8 DROPS (demountable rack offloading and pick-up system) support vehicle, 8x8 bridging vehicle, and an 8x8 high-mobility 3304 gallon (15,000 litre) bulk refuelling tanker. All of the trucks were powered by Cummins engines, and shared a common approach to chassis design.

Power was provided by a Cummins QSK-19-750 turbocharged six-cylinder after-cooled diesel engine mounted in a full-width engine compartment behind the cab. The engine, reputedly derived from a unit designed by Cummins for diesel railcar applications, produced 750bhp (560kW) from its 18,900cc (1153in³), combined with a massive 2275 lbf/ft (3.08kNm) of torque. Electronic management of the engine was controlled by a Cummins Quantum unit. The German-built ZF 5HP 1500 automatic transmission unit gave the vehicle five forward gears in combination with a three-phase integral torque converter and two-speed transfer case, and was, apparently, only on loan from the manufacturer. The transmission was controlled electronically by an EST 18M unit linked to the engine-management system for optimum gear changes regardless of load and road conditions.

The drive was connected permanently to all eight wheels and the axles were of the spiral-bevel hub-reduction type; steering was provided on both front axles, which were 9.5-tonne units supplied by GKN, whilst the two rear axles were rated at 18 tonne each and were manufactured by Unipower.

The engine and transmission were chosen to provide a maximum road speed, loaded to 115 tons (117 tonne) gross train weight, of 53mph (85km/h); unprepared wading depth was 48in (1220mm).

Twin independent Reynolds Boughton 25-tonne hydraulic winches were mounted behind the engine compartment to assist in loading and unloading disabled AFVs. The winches could be configured to pull in tandem or to allow one winch to pull an AFV down the trailer deck whilst the other was used to control the rate of descent. A double-oscillating cast-steel fifth wheel was mounted more-or-less above the centre-line of the third axle at a height of about 66in (1676mm).

The six-man, two-door crew-cab was a flat-floor, space-frame design with welded external panels; the driver was provided with an air-suspended seat and the remainder of the accommodation could be configured to provide seating for a co-driver and a four-man tank crew, or as a sleeper cab for two. Heating equipment was fitted as standard, and air-conditioning was available. The cab also included such features as an observation hatch, anti-aircraft hip ring and gun mount.

Subscribing to the 'folded paper' school of design, the cab was almost totally devoid of curves, and yet the cab and engine compartment contributed in no small part to the purposeful appearance of the vehicle.

For the MoD trials the chosen trailer was a Nicolas TST 70MD 6/2 unit, with 24 independently-sprung wheels arranged on six axles, giving a maximum 11.78 tons (12 tonne) loading per axle. The rear three of which were designed to steer in response to inputs from the fifth-wheel coupling. The trailer was coupled to the tractor by means of an active gooseneck with hydraulic adjustment of height to give a levelling capability ranging from +22in to -18in (+558mm to -457mm) and 15° vertical articulation on the move. The length of the trailer bed was chosen to allow the carriage of a single main battle tank or two light tanks or infantry fighting vehicles (IFVs); loading was effected via a pair of hydraulically-operated ramps.

Sadly, the MH-8875 was eventually eliminated in favour of the Oshkosh M1070F. One of the major reasons for its failure was said to be its inability to comply with the Euro 3 emissions classification but, with an overall width of 118in (3m), the tractor would have been considered to be 'oversized' for normal use on British roads. However, the loss of this contract proved to be the last straw for Unipower and the company was put up for sale and wound-up soon after. The manufacturing site was sold in the year 2000.

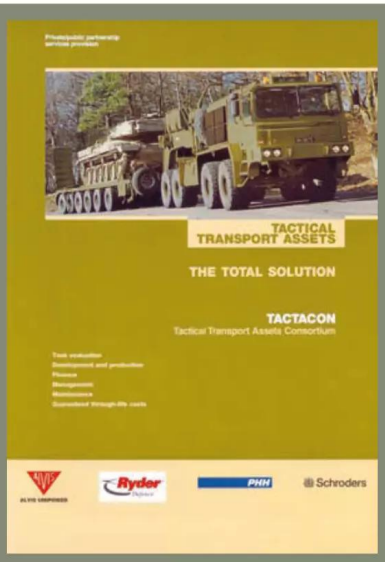
But what became of the MH-8875 I hear you ask?

Well, after spending some time in a semi-dismantled state at the former GKN works in Telford, at the time the home of Alvis Vehicles Limited, it was

● MH-8875 tractor photographed at the Chertsey test track of the Defence Logistics Organisation (DLO) during trials in 2000. Only one example was constructed.

rumoured that a group of enthusiasts was hoping to get hold of the vehicle and try to return it to running condition. But, in the end it was not purchased by enthusiasts but by Alstom Power Service who bought it, sans the borrowed gearbox, from Alvis. When Abnormal Load Engineering (ALE) acquired Alstom's heavy lifting and transport operations – the so-called the Distribution Services Division (DSD) – at the end of 2004, it also acquired the MH-8875, by this time fitted with an Allison 5000 automatic transmission in conjunction with a Kessler transfer box, and running well. ALE quickly adopted the MH-8875, registered P547 HNT, as its lead tractor with a simple ballast box in place of the fifth wheel.

But the story doesn't end there... in 2012, the company realised that many of its existing ballast tractors, which were becoming a little long in the tooth, were ripe for replacement... but, unfortunately there was no longer any company in Britain that was willing, or able, to undertake the design and construction of a vehicle that would suit ALE's particular requirements. The only alternative seemed to be for ALE to go into the design and manufacture business.



● Tactacon – Tactical Transport Assets Consortium – brochure designed to promote the partnership formed between Alvis-Unipower, Ryder Defence, PHH Vehicle Management Services, and J Henry Schroder to bid for the PFI (private finance initiative) contract for the replacement of the Scammell Commander.

● After failing to gain the PFI contract, the Alvis-Unipower MH-8875 was eventually sold to Alstom Power Service, and later passed to Abnormal Load Engineering (ALE) where it was adopted as the company's lead tractor for heavy haulage work. In 2012, ALE used the MH-8875, and six surplus 8x8 M Series bridging vehicles, as the basis for a new truck. *(Abnormal Load Engineering)*

● The chassis, cabs and axles of six M Series tractors provided the basis for what ALE describes as the Trojan 8870. Powered by a 700bhp (522kW) six-cylinder Volvo Penta engine driving through an Allison M6620-AR six-speed automatic transmission, the trucks are plated for a gross train weight of 295 tons (300 tonnes). The first example was launched to the trade press on 23 October 2014. *(Abnormal Load Engineering)*

Gary Butler, ALE's project manager and designer of the new truck, acquired half a dozen military-surplus Unipower 8x8 M Series tractors from the French Army, and the chassis, cabs and axles of these six tractors provided the basis for what ALE describes as the Trojan 8870. The original Cummins engine has been replaced by a 700bhp (522kW) six-cylinder Volvo Penta TAD-1662-VE engine driving through an Allison M6620-AR six-speed automatic transmission. The first example was launched to the trade press on 23 October 2014.

Four of the trucks, which are plated for a gross train weight of 295 tons (300 tonnes), and have a maximum road speed of 48mph (77km/h), have been retained in Britain, the remaining two have been shipped to the Middle East.

Following the acquisition of ALE by the Dutch heavy-haulage specialists, Mammoet, in 2019, the original MH-8875 was put up for sale in February 2020... with only 79,000 miles (127,000km) on the clock!

THE M1070F

The M1070F heavy equipment transporter... as American as apple pie?

Like all of the M1070 variants, the M1070F is a huge, fast and formidable machine, in this case with a massive six-cylinder engine producing 700bhp (522kW) together with great gobs of torque, seven forward gears, eight driven wheels, and twin winches. The first British tank transporter to have all-wheel drive, it is capable of a governed top speed of 60mph (100km/h) unladen, and a creditable 51mph (82km/h) when carrying a combat-ready Challenger 2 main battle tank. Hill-climbing performance is excellent, and the vehicle has a minimum operating range of 300 miles (500km) at a gross train weight of 260,000 lb (118,182kg). The M1070F is said to be suitable for world-wide operation on primary, secondary and unimproved roads in climatic conditions ranging from -26˚F to 120˚F (-32˚C to 49˚C).

The M1070F shares a common chassis and axle arrangement with the original US Army M1070, but all major drive-line components have been substantially revised, and the new engine and transmission share some commonality with the British Army's Oshkosh wheeled tanker. The front end of the cab has been modified to suit European construction and use regulations, and to accommodate the new engine.

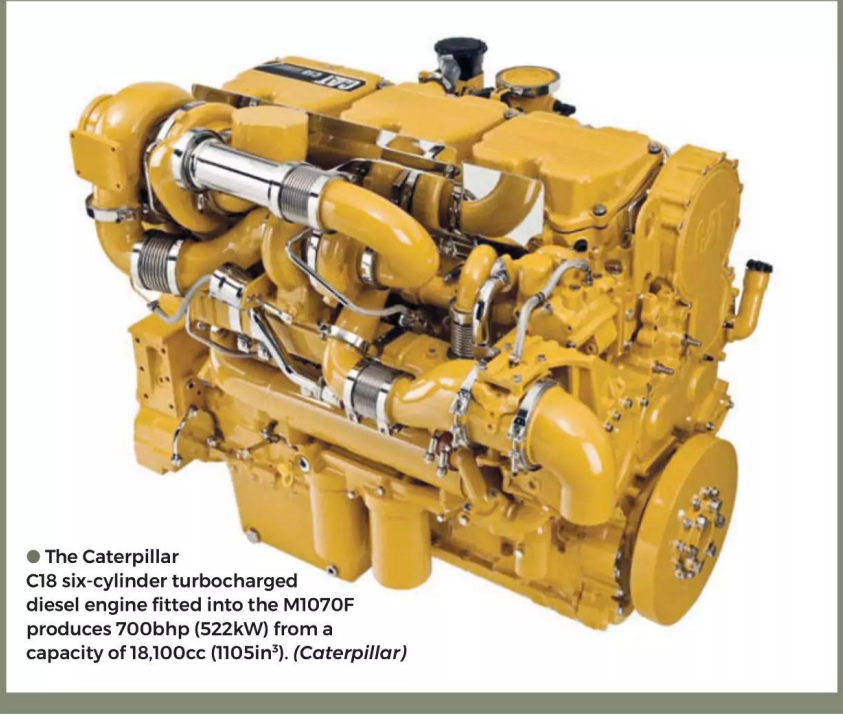
Designed primarily for the Challenger 2 main battle tank, the 38 foot (11.5m) long bed of the seven-axle King GTS110/7 semi-trailer also allows it to carry, for example, a pair of Warrior infantry fighting vehicles, the AS90 self-propelled gun, sundry engineers' plant, or other dense stores within the maximum 70.7-ton (72-tonne) carrying capacity. The complete vehicle, with semi-trailer, is air-portable in

● Convoy of three M1070F tractors and semi-trailers photographed kicking up a dust storm in the Middle East. The load is the Challenger armoured repair and recovery vehicle (CRARRV). *(Crown copyright)*

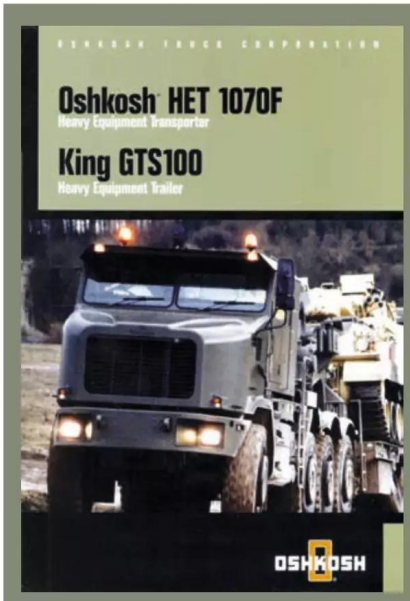
● The prototype M1070F was based on the M1070E1 and differed in a number of ways from the production vehicles... most noticeably in the design of the extended nose, necessary to accept the increased length of the Caterpillar six-cylinder engine, and in the use of a three-door cab. *(Oshkosh)*

● The length of the semi-trailer allows doubling up of the load... in this case, a pair of FV510 Warrior infantry fighting vehicles. *(Crown copyright)*

● Running on civilian registrations, three M1070F tractors loaded with Challenger 2 main battle tanks.



● The Caterpillar C18 six-cylinder turbocharged diesel engine fitted into the M1070F produces 700bhp (522kW) from a capacity of 18,100cc (1105in³). *(Caterpillar)*



● Oshkosh specification sheet for the M1070F, dated 2003.

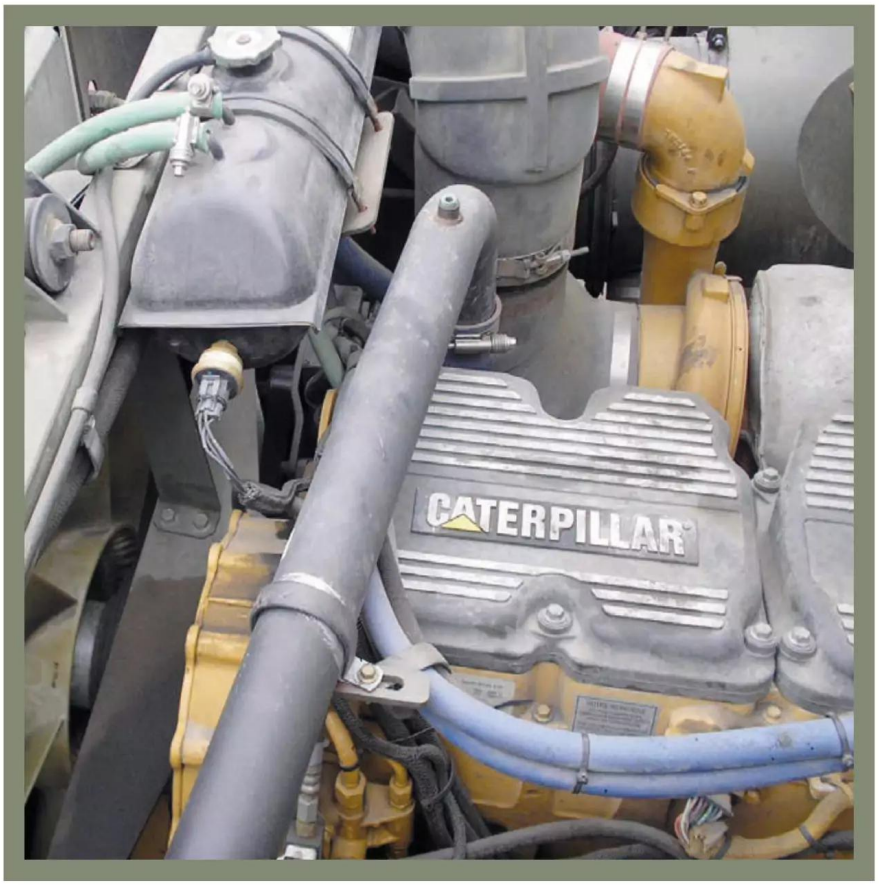
Boeing C-17 Globemaster III heavy-lift transport aircraft, and in the US Air Force's Lockheed C-5 Galaxy and Super Galaxy. A total of 92 vehicles have been constructed, with 91 remaining in service with the British Army at the time of writing (autumn 2020).

Engine

Although both the original M1070, and the M1070E1, on which the British Army variant was based, were powered by Detroit Diesel engines, the M1070F is fitted with a Caterpillar C18 turbocharged and after-cooled engine which provides more power.

Caterpillar can trace its origins back to the steam tractors constructed at the end of the 19th Century by Benjamin Holt and CL Best. The modern Caterpillar company was established in 1925, and was originally headquartered in San Leandro until 1930, when it moved to Peoria, Illinois. The company has grown to become the world's leading manufacturer of diesel and natural-gas engines, industrial gas turbines, construction and mining equipment, and diesel-electric locomotives, and is a major supplier of military engineering equipment.

The C18 is a six-cylinder, direct-injection four-stroke industrial power unit with a compression ratio of 16:1 and a capacity of 18,100cc (1105in³). It is capable of running equally on NATO diesel or Jet-A1 fuels, and produces a maximum power output of 700bhp (522kW), combined with a



● Under-bonnet view showing two of the six cylinders and the turbocharger.

maximum torque figure of 1900 lbf/ft (2.576kNm), and is Euro 3 compliant for tailpipe emissions of carbon monoxide, hydrocarbons, nitrous oxide, and ammonia. The Caterpillar C18 engine was also specified for the improved M1070A1 and the 6x6 Global HET variants.

Transmission

The engine is close-coupled to a GM Allison TC-561 torque converter and an HD-4076P seven-speed automatic transmission, with sixth and seventh gear being over-drive. There is an Oshkosh 30000 single-speed transfer case, with planetary differential and air-operated differential locks, and all eight of the tractor wheels are permanently driven.

An oil-to-air cooler is located below the winch station, providing cooling for the transmission and transfer case lubricants.

Axles

All four axles are Rockwell SV1 5MR units, with planetary hub-reduction gears. The front axle can withstand an imposed load of 10.67 ton (10.87 tonne), whilst the rear axles are rated at 11.14 ton (11.34 tonne). The torque is split 30/70 between the front axle and the remaining three, and there are automatic inter- and intra-axle differential locks, with a manual over-ride.

Chassis

Manufactured from a pair of U-shaped heat-treated carbon-manganese steel channels, each 14 x 3.5in (356 x 89mm), and 0.37in (9mm) thick, the massive chassis frame is of bolted construction and carries the cab and the major automotive components, including the engine, transmission and axles.

A heavy-duty bumper is provided at the front and a pintle hook at the rear; there are also front and rear towing eyes.

Steering

The steering gear has integral hydraulic assistance, operating on the front and rear axles of the tractor. The wheels turn in opposing directions in response to the operator turning the steering wheel. And, believe it or not, the official US Army 'Operator's Manual' (TM9-2320-360-10) for the M1070 has this to say about the steering wheel... '[the steering wheel is] used to control direction of HET tractor travel'. If you need to be told that, I would seriously question your suitability to being put in charge of any motor vehicle, let alone one as large as the M1070!

The semi-trailer also steers in response to changes of angle at the kingpin. A hydraulic sender unit operates the first and the final four pairs of axles.

● Allison HD-4076P seven-speed automatic transmission. *(GM Allison)*

● Tractor spare wheel mounting. *(Ian Young)*

Suspension

The front axle is suspended on Hendrickson parabolic taper leaf springs, whilst the rear tridem bogie is carried on a Hendrickson-Turner heavy-duty air-ride system.

Braking systems

The tractor service brakes are Rockwell (now AxelTech) air-operated internal shoe type, with Bendix anti-lock (ABS) and automatic traction-control systems (ATC). There is also an air-activated parking brake that acts on the three rear axles of the tractor, and a vacuum-operated engine brake, often described as a 'Jake brake', to prevent over-use or over-heating of the service brakes when descending gradients.

CTIS

A Dana central tyre-inflation system (CTIS) is provided, with pre-set values for highway, cross country, mud-sand-snow, and emergency conditions. The CTIS has been devised to ensure that a tyre remains operational even if it has been penetrated by a bullet.

● M1070F complete with its intended load... the Challenger main battle tank, just visible in the photograph.

There is a Lister-Petter LPA2 auxiliary engine, for the semi-trailer hydraulic power-pack, mounted on the trailer nose.

Cab

The six-man crew cab is of welded-steel construction with a corrosion-resistant external skin, and, from the firewall back, is similar to the original M1070, although it does not have the four-door arrangement developed for the M1070E1. The engine cover is of resin-composite construction, and has been extended to accommodate the longer power unit. Looking very much like an afterthought, it is mounted on the chassis to open forwards.

Small vision panels are fitted low-down in the doors to provide a view alongside the vehicle, and a circular hatch in the cab roof allows the use of an anti-aircraft or spotter's machine gun. The driver and front-seat passenger are carried on widely-spaced adjustable air-suspended seats, whilst the rear bench provides seating for four and can be converted to provide sleeping accommodation. For the comfort and safety of the crew, all six seats are provided with three-point safety belts, and the steering wheel has a tilt/telescopic feature. The cab is provided with heating and defrosting equipment but, unlike the US Army's M1070, there is no optional air conditioning.

The dashboard would definitely count as being 'well stocked'. Consider this lot... speedometer, tachometer, water temperature, oil pressure, transmission-oil temperature, transfer-case oil temperature, battery-voltage indicator, fuel gauge, and air-pressure gauge, plus more switches and warning lights than you would have found at Chernobyl. There is even a cruise-control system. All of the gauges are rather charmingly described in the operator's manual as displaying in 'English and metric' units.

The M1070F is fitted with the Eaton VORAD EVT-300 side- and forward-facing radar and collision-avoidance system, with the antenna mounted on the front bumper. This assists in visualising movements of adjacent vehicles and helps counter blind spots on the nearside.

● Inside view of the two-man cab. The crew are provided with air-suspended seats; there is additional seating for four more crew members in the rear, which can be converted to bunks. *(Carl Schulze)*

● The M1070F is probably the largest tactical vehicle deployed by the British Army. *(Phil Moth)*

Cab armour

From 2005, M1070F tractors were fitted with an add-on armour package, manufactured by Permali Gloucester, to protect the side and rear panels of the cab; subsequent improvements to this armour included ballistic glass for the windscreen and side windows.

M1070F tractors deployed to Afghanistan and Iraq in 2008 were fitted with stand-off bar armour surrounding the cab to provide protection against rocket-propelled grenades (RPG), as well as run-flat inserts in the tyres. Tarian textile composite armour, produced by Bridport-based company AmSafe, defeats the same threats as bar armour whilst providing a lighter weight alternative, and ten M1070F tractors were thus equipped in 2009 for operation in the Middle East. Tarian can also be used in conjunction with bar armour.

Many US Army M1070 tractors have been fitted with the 'crew protection kit' which provides protection from snipers and improvised explosive devices (IED). The kit includes stand-off and *appliqué* armoured panels for the cab and the firewall, armoured protection for the floor and the fuel tanks, and ballistic glass for the windscreen and side windows.

Electronic protective systems

Some vehicles are also fitted with AN/VLQ-12, a 'counter radio-controlled improvised explosive device (RCIED) electronic warfare (CREW) system' to help neutralise multiple road-side threats posed by such weapons. And 'other electronic counter measures' are also available!

● From 2009 onwards, M1070F trucks deployed to Afghanistan were protected by AmSafe Tarian textile armour panels. *(Shaun Connors)*

Fifth wheel

A fully-oscillating cast-steel fifth wheel is mounted slightly ahead of the centre-line of the third axle, at a height of 66in (1676mm). Kingpin diameter is a standard 3.5in (89mm) diameter, as laid down in standards ISO 4086 or SAE J700.

Winches

Two twin-speed hydraulic winches, supplied by DP Winch Products, are mounted behind the cab, each with a capacity of 55,000 lb (25,000kg) and 220 feet (6700mm) of 1in (25mm) diameter steel-wire rope. A lighter-duty auxiliary winch, also from DP Winch, is mounted behind the left-hand main winch, intended for reeling in the winch cable. All three winches are independently operated from the screened winch-operator's station.

Tru-Hitch system

Three of the British Army's M1070F tractors were supplied with the Tru-Hitch fifth-wheel hydraulic towing and recovery device (FWTRD), allowing one M107F to provide assistance to another without detaching the broken-down tractor from its semi-trailer.

Weighing some 8704 lb (3820kg), the FWTRD system mounts to the fifth wheel and rests on the rear of the chassis. When deployed, a forked tow bar is rotated to a horizontal position, and used to lift the front end of a casualty, allowing it to be towed, at speeds of up to 50mph (80km/h), complete with a loaded semi-trailer. It can also be rigged to the winches to provide a versatile recovery crane.

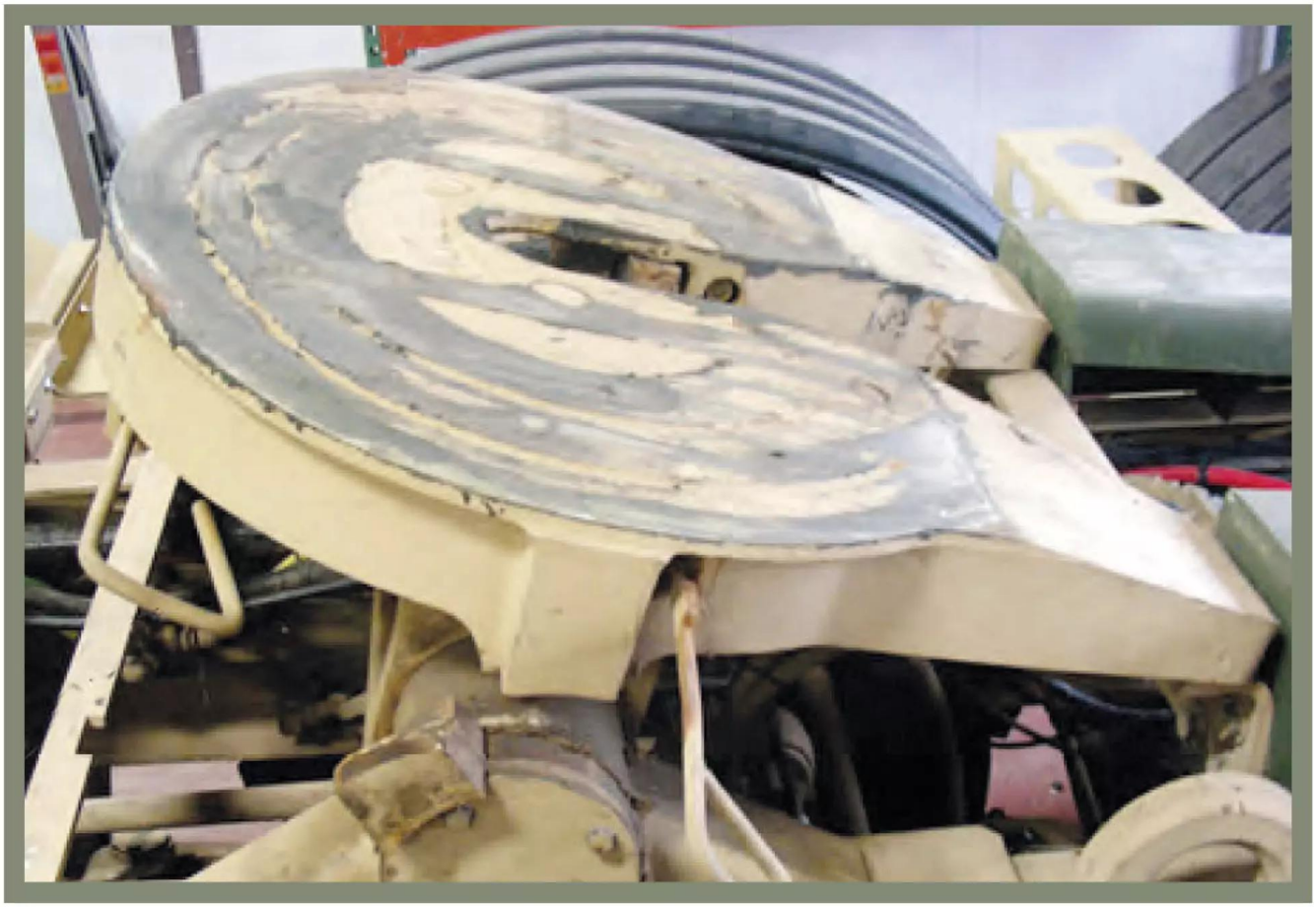
The equipment is produced by Tru-Hitch Inc of Barkhamsted, Connecticut, and can be packed into a standard ISO container when dismounted.

Semi-trailers

Although both five- and six-axle semi-trailers were used during the trials phase, the standard trailer is a seven-axle flat-top unit, rated at 70.9 tons (72 tonne), and designed to couple to the fifth wheel of the tractor via a 'Hydroneck' hydraulic swan neck. Produced by King Trailers, and designated GTS100/7, the contract for the semi-trailer was said to have created 50 jobs at the company's Market Harborough plant. The

● M1070F fitted with Permali cab armour upgrade to protect against ballistics, and mine and bomb fragments. *(Permali Gloucester)*

● The armour upgrade for the M1070F includes stand-off bar, or slat, armour and composite textiles to protect the crew from small arms fire and IEDs. *(Shaun Connors)*



● Manufactured from cast steel, the fifth wheel has an operating height of 66in (1676mm) and accepts a standard 3.5in (89mm) diameter kingpin. *(Oshkosh)*

● The fifth wheel is positioned over the centre rear axle. *(Shaun Connors)*

● Both winches are controlled from the operator's station, which also includes the controls for the auxiliary winch. *(Ian Young)*

● Twin DP twin-speed hydraulic winches are mounted behind the cab, each with a 55,000 lb (25,000kg) rating.

company claimed that the semi-trailer was suitable for use both on and off the road... a claim which was later to lead to a so-called 'urgent operational requirement' (UOR) for a replacement.

To reduce tyre scrub, the leading axle row, and the rearmost four axle rows, are designed to steer in response to inputs from the fifth wheel, with the steering operated hydraulically from the power-pack. The suspension is of pendular design, and each wheel pair is capable of a total of almost 24in (600mm) of movement, consisting of a 16in (402mm) rise, and 7in (180mm) drop. Both the steering and the suspension are operated by a two-cylinder Lister-Petter diesel power-pack mounted on the trailer swan neck.

The trailer has a spine chassis and is fully decked across its width; 39in (1m) long hydraulically-operated ramps are provided at the rear for loading, and folding outriggers can be deployed to increase the width of the deck to 137in (3470mm). A hydraulic steady device automatically raises with the ramps,

● Rated at 70.9 tons (72 tonne), the standard British Army semi-trailer is a seven-axle flat-top unit with a 'Hydroneck' hydraulic swan neck, produced by King Trailers, and designated GTS 100/7. *(Ian Young)*

● With an overall length of 297in (7.54m), the FV180 combat engineers tractor (CET) scarcely occupies half of the total length of the trailer.

● The combination of the tractor and semi-trailer has an unladen weight of 45.4 ton (46.1 tonne). *(Phil Moth)*

whilst a spring counterbalance system allows two men to raise and lower the ramps manually in the event of hydraulic failure.

The semi-trailer performed well in Iraq when running on relatively flat terrain, but was less successful in Afghanistan, leading to the MoD coming up with a UOR in 2009 that resulted in the purchase of 20 heavy-duty 44-ton (45-tonne) improved-mobility two-axle trailers from the Dutch company Broshuis.

M1000 semi-trailer

The US Army's M1000 semi-trailer is a similar flat-topped, swan-neck design, with five well-spaced axles, and was originally developed as a private venture by Southwest Mobile Systems (now DRS Technologies), based in St Louis, Missouri.

Each of the five axles carries four pairs of wheels, all of which are hydraulically steered and suspended. A diesel auxiliary power unit provides hydraulic fluid under pressure for the swan neck, the steering and the suspension. As well as being equipped with movable track guides, the trailer deck is provided with brackets and locks to secure ISO

shipping containers. By July 2009, a total of 2600 of these trailers had been ordered for the US Army.

In June 2019, Broshuis was selected to supply 170 eight-axle semi-trailers to the US Army for use in Europe. The contract, worth $109.8 million, was the result of an 'operational needs statement' for a semi-trailer that could deliver increased payload capability without compromising civilian axle loading figures.

● The original King semi-trailer performed well on relatively flat terrain, but was less successful in Afghanistan. In 2009, the MoD identified an urgent operational requirement (UOR), resulting in the purchase of 20 Broshuis heavy-duty 44-ton (45-tonne) improved-mobility two-axle trailers. *(Shaun Connors)*

● M1070F tractor and semi-trailer, demonstrating the length of the flat-topped trailer.

Repairs and rebuilding

War-damaged vehicles have been repaired by West End Garage in Bruton, Somerset, some 30 miles (50km) from the home of Number 19 Tank Transporter Squadron at Bulford.

In 2011, Fasttrax was looking for an organisation to undertake the refurbishment of 30 M1070F tractor units that had returned from Iraq and Afghanistan, with the intention of returning them to as-new condition. As a trial, two tractors were handed over to West End Garage, and two to Commercial Contract Engineers (CCE), based in Rochdale. All four of these vehicles had been badly damaged by improvised explosive devices (IEDs). Eventually, Fasttrax asked

● US Army M1000 five-axle flat-topped, swan-neck semi-trailer, rated at 70 short tons (63.6 tonne). *(US Department of Defense)*

CCE to undertake the refurbishment of the remaining 26 tractors, with the damaged semi-trailers being returned to King Trailers. The total value of the work was £2 million.

The refurbishment work took up to 1200 hours per vehicle, meaning that it took a year to complete three vehicles, with a maximum of four being worked on at one time. As experience was gained, the time spent on each tractor began to come down, but, nevertheless, the work was not without its challenges... the procurement of parts was sometimes an issue, but it was the presence of sand inside the vehicle

as well as in electrical components, engines, transmission and axles that left a lasting impression!

Commercial Contract Engineers received a 'Technician Team of the Year Award' from 'Commercial Motor' magazine for their work, coinciding with the last of the 28 vehicles being returned to the squadron in June 2018. The organisation was also a finalist in the 'Heavies' awards run by 'Heavy Torque' magazine in March 2019.

CCE was subsequently contracted to refurbish more of the fleet.

● US Army M1070A1 with the eight-axle Broshuis PL2 pendular axle low-loader semi-trailer.

● M1070F with the semi-trailer deck raised to its full height. The hydraulic suspension gives a rise of 16.5in (402mm) and a drop of 7.1in (180mm). *(Ian Young)*

● Commercial Contract Engineers (CCE), based in Rochdale, undertook the refurbishment of 28 Oshkosh M1070F tractors for a total of £2 million. Here, Michelle Walker, Managing Director of CCE, hands the keys of the last vehicle to be refurbished, to Brigadier Simon Hamilton, head of the vehicle support team at DE&S. *(Crown copyright)*

● Note the twin spare wheels for the semi-trailer and the small davit crane used to load and unload them. A second davit is stowed behind the cab and is used to handle the spare wheel for the tractor. *(Ian Young)*

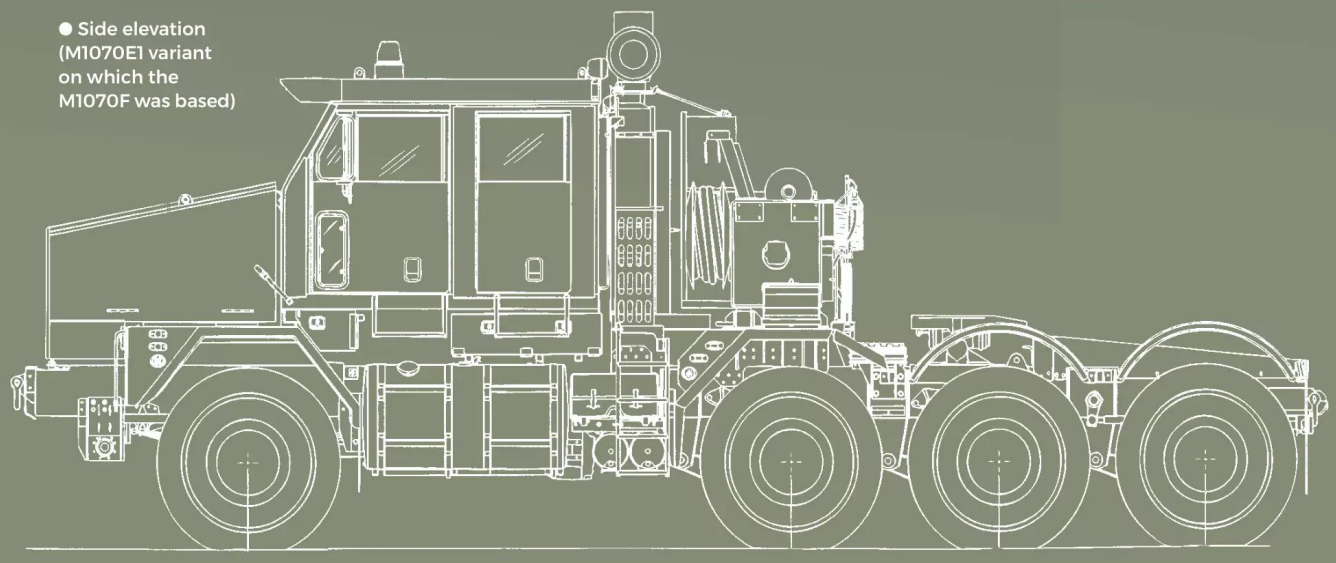
18 KM 23
STGO
CAT 3

● M10170F pulling out of the Port of Duqm, Oman. *(Crown copyright)*

FACTS & FIGURES – OSHKOSH M1070F

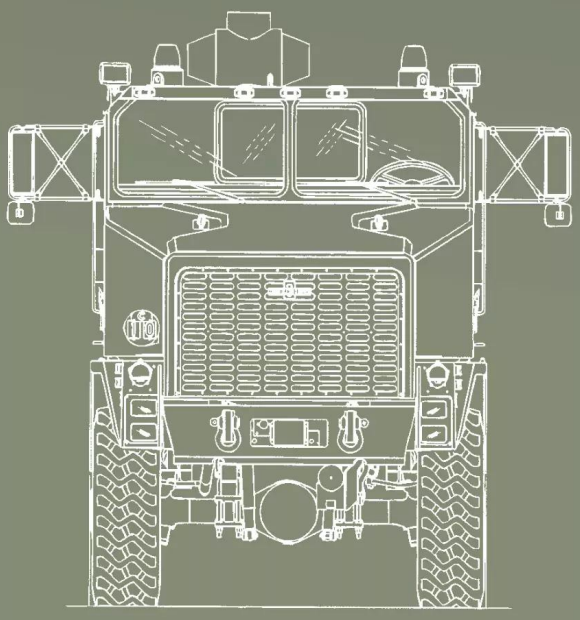
Engine: Caterpillar C18, turbocharged, after-cooled diesel		
Cylinders	6, in-line	6, in-line
Capacity	18,100cc	1105in³
Bore and stroke	5.71 x 7.2in	145 x 183mm
Fuel	MT DIESO F-54, Jet-A1	MT DIESO F-54, Jet-A1
Power output at 1300rpm	700bhp	522kW
Maximum torque at 1300rpm	1900 lbf/ft	2.576kNm
Auxiliary engine for semi-trailer hydraulic power-pack: Lister Petter LPA2		
Cylinders	2	2
Capacity	726cc	44.3in³
Bore and stroke	2.99 x 3.15in	76 x 80mm
Fuel	MT DIESO F-54, Jet-A1	MT DIESO F-54, Jet-A1
Power output at 3000rpm	13.9bhp	10.36kW

Dimensions and weight		
Length		
tractor only	378in	9600mm
overall, ramps raised	922in	23,400mm
tractor with Tru-Hitch recovery gear	396in	10,558mm
semi-trailer only	661in	16,800mm
semi-trailer load deck	453in	11,500mm
Overall width		
tractor, excluding mirrors	102in	2591mm
tractor, mirrors extended	145in	3670mm
semi-trailer	114in	2890mm
semi-trailer, with outriggers deployed	136in	3470mm
Height		
top of cab	130in	3302mm
top of raised ramps	133in	3394mm
trailer bed, suspension at full drop	49in	1260mm
trailer bed, suspension at full height	74in	1880mm
Wheelbase, tractor	275in	6985mm
Bogie centres	60in	1524mm



● Side elevation (M1070E1 variant on which the M1070F was based)

Track		
front	85in	2159mm
rear	85in	2159mm
semi-trailer	98in	2500mm
Ground clearance		
minimum, tractor	15.9in	404mm
minimum, semi-trailer	13.8in	350mm
Fording, unprepared	30in	760mm
Turning circle, tractor and semi-trailer	100ft	30.5m
Weight, unladen		
tractor only	19.8 ton	20.1 tonne
tractor with Tru-Hitch recovery gear	23.47 ton	23,9 tonne
semi-trailer only	25.6 ton	26 tonne
complete train	45.4 ton	46.1 tonne
Maximum permissible laden weight	115.94 ton	118.05 tonne
semi-trailer only	96.25 ton	98 tonne
typical kingpin load	15.7 ton	16 tonne
maximum kingpin load	23.18 ton	23.6 tonne
Bridge classification		
tractor only	40	40
complete train, unladen	50	50
complete train, laden	120	120
Air transportability	C-5, C-17 aircraft	C-5, C-17 aircraft
Performance		
Fuel consumption, with 72 tonne load	1.43mpg	0.5km/litre
Maximum speed, unladen	60mph	97km/h
Maximum speed, with 72 tonne load	50mph	81km/h
Maximum grade, stop-restart	1 in 6	15%



● Front elevation (M1070E1 variant on which the M1070F was based)

● M1070F tractor wearing its civilian registration number... it would be interesting to know whether the same civilian number plates get assigned to the same vehicle each time the plates are fitted. *(Crown copyright)*

REGULARS AND SPONSORED RESERVISTS

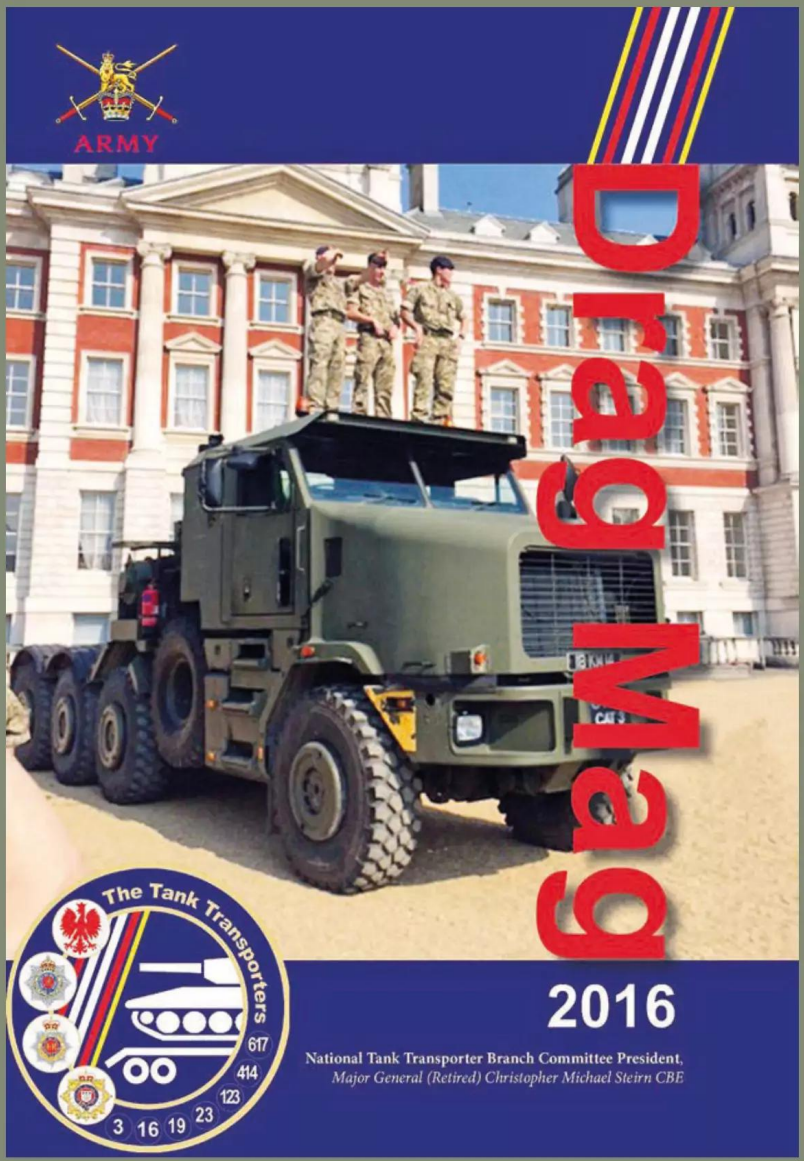
The M1070F in service

The first Oshkosh M1070F tractors were delivered to the British Army in early 2003 and were assigned immediately to training, or familiarisation, duties. By July of that year, the first vehicles were operational and within 12 months, the last of the 92 tractors and trailers had been delivered to three tank-transporter squadrons of the Royal Logistics Corp, Numbers 3, 16, and 19. Despite being primarily intended to transport the Challenger 2 main battle tank, the first M1070F tactical move took place on 7 July 2004, in the form of an AS-90 self-propelled gun.

As regards the tank-transporter squadrons, Number 3 was based at Antwerp Barracks, Sennelager, but was subsequently disbanded and amalgamated with Number 16 Squadron, which had its headquarters at Fallingbostel, in northern Germany. In turn, Number 16 Squadron was disbanded on 25 July 2014, with the last remaining troop integrating with Number 19. In response to the closure of Number 16 Squadron, Fasttrax stationed 14 transporters and ten reservists at Sennelager to provide a heavy-lift capability during the closing and clearance of the site.

During the closure ceremony for Number 16 Squadron there was a drive-past that included a Thornycroft Antar Mk 3, a Scammell Commander, and an Oshkosh M1070F... what a sight that must have made!

Today, the Oshkosh M1070F is assigned to the British Army's only tank-transporter squadron – Number 19 – which is based at Ward Barracks, Bulford and forms part of 27 Regiment Royal Logistics Corps (RLC). Only 91 tractors now remain, one having been written-off in Afghanistan. By way of contrast, the US Army has purchased 2488 examples of the original M1070A0 variant, and 1591 examples of the M1070A1... giving a massive total of 4079 vehicles.



● The Royal Logistics Corps relaunch of the '*Drag Mag*', published at the beginning of 2017, featured the Oshkosh M1070F on the front cover, and included a piece on the delivery of a Challenger 2 to Horse Guards Parade for the commemoration of the Battle of Fleurs.

Tank-transporter performance

Take a look at the table on page 98 which sets out the performance of the five generations of British tank

● M1070F complete with trailer and Challenger load... running on trade plates.

● US Army M1070 photographed in Iraq with a MiG-25RB Foxbat-B found buried under the sand west of Baghdad in February 2004. *(US Department of Defense)*

● 'Road Dawgs'... line-up of three US Army M1070 tractors of the 27th Main Support Battalion, Division Support Command, 1st Cavalry Division. *(US Department of Defense)*

transporter, covering a period of almost 90 years. As tanks have becoming larger and heavier, transporters have been forced to become ever-more capable, reaching levels of performance that would have been unthinkable even 30 years ago... engine power output has risen almost ten-fold, and maximum road speeds for a loaded transporter have gone from a very modest 15mph (30km/h) back in the 'thirties, to 60mph (100km/h).

The days of queues of traffic building-up behind a convoy of slow-moving heavy military vehicles are almost a thing of the past.

Regular Army crews

The Army's School of Tank Transporting delivers regular driver tank-transporter operator (DTTO) courses from Class A3 operator to Class A1. An A3 tradesman is qualified to take charge of the winch and is permitted to load a dead tank; at level A2, the soldier is able to take full responsibility for the tractor unit; and those who have qualified at level A1 are permitted to drive tanks on and off the trailer... always providing they have a 'Category H' track-layer licence.

It can take up to six years to progress through the three stages and, regardless of their role, all tank-transporter crews have to undergo six days weapon training a year.

At the time that the Oshkosh was introduced in 2004, the total number of tank-transporter tradesmen in the British Army was 462. In peacetime, a tank-transporter crew consists of two men. In times of war this is raised to a level of 2.5 by increasing the number of men involved in a troop, but, clearly there were many more qualified crew men than would seem to have been required.

Reservists

In essence, Fasttrax signed a 20-year PFI contract with the British government that required them to provide a transport service for heavy equipment plus a percentage of trained reservists. The contract included 92 tractors and 89 semi-trailers, such maintenance and refurbishment as would be necessary during the life of the contract, and 85 trained Group C (formerly Territorial Army) sponsored reservists. These reservists, who

● US Army M1070 tractors, with M1000 semi-trailers, photographed at Contingency Operating Base Speicher, Iraq in February 2008. *(US Department of Defense)*

● Note how the wheels on the first and fourth axles of the tractor turn in response to the steering wheel in order to reduce the turning circle.

● Self-help group... there's plenty of room on the King semi-trailer for a disabled M1070F tractor. *(Crown copyright)*

made up approximately one third of the total number of HET drivers and maintainers, are trained in basic military skills to exactly the same standard as regular soldiers and are said to be the 'first privately-contracted soldiers to operate in high-risk zones'... well, at least since the end of the Napoleonic Wars in 1815!

Using reservists as tank-transporter crew allowed the number of tank-transporter tradesmen to be reduced from 462 to 330 by a process of natural wastage over a period of three years. The reservists, all of whom receive six weeks basic training before being let loose on the vehicles, are affiliated to the regular tank-transporter squadrons and

● Note the circular hatch in the cab roof, designed to allow the mounting of an anti-aircraft machine gun. *(Flickr: Charles Dawson)*

● Winching an M60 Patton battle tank onto the M1000 semi-trailer... the presence of street furniture makes this a tricky job. *(US Department of Defense)*

● US Army M1070 with a Fox NBC-detection vehicle on the semi-trailer. The M93A1 Fox acts as a mobile laboratory, sampling air, water, and soil for signs of weapons of mass destruction. *(US Department of Defense)*

● AS-90 ('artillery system for the nineties') Vickers 155mm self-propelled gun on the King semi-trailer. Entering service in 1992, the AS-90 saw service in Iraq, and is expected to remain in service until 2032. *(Ian Young)*

● US Army M1070 and M1000 semi-trailer assigned to the 233rd Transportation Company, based at Fort Knox, Kentucky. The truck is hauling an M88A1 tracked recovery vehicle. *(US Department of Defense)*

many are former full-time soldiers. The reservists can be mobilised, or 'called-up', for nine months at a time during which period they are under Army command even though they continue to be paid by Fasttrax. The current salary for a Class 1 driver is £30,000 a year; this is increased by 50% if the driver is deployed on operations in military uniform.

During the first ten years of the contract, Fasttrax moved 7000 loads and the vehicle fleet covered more than 4.03 million miles (6.5 million km). Increased flexibility came in 2011, when a change to the contract terms removed the lower weight limit of 24.5 tons (25 tonne), meaning that vehicles such as the Warrior, Mastiff and Wolfhound can now be carried. Since that time, Fasttrax has carried more than 1500 additional loads weighing less than 24.5 tons (25 tonne).

Numbers of transporters

There has been some recent criticism in the press of the numbers of tank transporters available to the Army. For example, writing in '*The National Interest*', a web-based news magazine, in 2019 Michael Peck and Jack Watling wrote that 'Britain will soon only have 148 tanks and no way to transport them'. However, this may be based on a misunderstanding of the problems involved.

It has always been customary to have considerably more tanks than transporters, and in March 1992, Murray Hammick, who is now editor-in-chief of the '*Military Times*', wrote in Janes' '*International Defence Review*' that he believed the desirable ratio of transporters to tanks is generally considered to be between 1:7 and 1:12, with a minimum availability of 75%.

On the face of it, Hammick's figures indicate that a maximum of 92 Oshkosh transporters should be able to handle between 644 and 1104 tanks, and at the time of writing (autumn 2020), the British Army has just 227 Challenger 2 tanks, out of a total of 386 constructed. There are also something like 750 Warrior infantry fighting vehicles which are also generally transported by the Oshkosh. So, despite stories suggesting that Britain does not have sufficient transporters, the numbers would appear to be about right... the real

● The total weight of the M1070F tractor, the King semi-trailer, and the AS-90 self-propelled gun approaches 91 tons (91.8 tonne)... and a rig this size can always be expected to attract attention.

● Power washing around the winch area. The M1070 tractor has been fitted with the so-called 'crew protection kit' consisting of sheet armour surrounding the cab, ballistic glass, and moulded ballistic armour for the fuel tank. *(US Department of Defense)*

● M1070F with a Finnish-built Kalmar RT240 rough terrain container handler (RTCH) on the King semi-trailer.

● US Army M1070 with an M60 Patton tank at the National Guard Armory, Bluffton, Indiana. Photographed on 30 June 2009. *(US Department of Defense)*

problem lies in where those transporters are based, and the distances that the loaded transporters are expected to travel. During the Cold War, the tank transporters were located close to the border between Germany and the eastern Bloc. However, the expansion of the European Union means that NATO's eastern border is now some 1250 miles (2000km) from former British bases in Germany... and, thus, a further 500 or 600 miles (800-975km) from Bulford.

But all recent deployments have been in the Middle East and it would seem that things are likely to remain that way for the foreseeable future... so, go figure!

Deployment

In December 2003, no more than a few months following delivery, and well ahead of schedule, the first Oshkosh tractors were deployed to Iraq as part of Operation Telic, which had been going on for so long that by 2005 it was being described as Operation Telic 6.

The Oshkosh has also seen service with the British International Security Assistance Force (ISAF) in Afghanistan, from 2006, where constant vigilance is required against the threat of improvised explosive devices (IEDs). One such device killed Private Kevin Thomson, of Number 19 Tank Transporter Squadron, who was seriously injured by an IED on 3 May

● Line-up of four M1070F tractors, each with a King semi-trailer and Challenger main battle tank; a fifth tractor – a so-called 'solo' – brings up the rear.

● US Army M1070A1 of the 96th Transportation Company, 553rd Combat Sustainment Support Battalion. Each semi-trailer carries an M577 armoured command post carrier and an M113 armoured personnel carrier.
(US Department of Defense)

● US Army M1070A1 complete with a mismatched M1000 semi-trailer. The vessel is MV Cape Texas, a roll-on/roll-off (RO/RO) ship with the Ready Reserve Force (RRF) of the US Department of Transportation's Maritime Administration (MARAD), operating out of Norfolk, Virginia.
(US Department of Defense)

● M1070F, with a Warrior infantry fighting vehicle on board, kicks up some mud.

● Photographed at the annual Defence Vehicle Dynamics (DVD) show, this M1070F is equipped with both bar armour and Tarian textile composite armour, as well as having a roof-mounted weapons station.

2007 and died three days later despite having been evacuated to Selly Oak Hospital, Birmingham.

During the deployment in Afghanistan, it is worth mentioning Operation Eagle Summit, a heroic 200-vehicle, six-mile long convoy that was a milestone for the RLC's mission in Afghanistan. The operation was intended to deliver seven 29.5-ton (30-tonne) sections of generator to the hydroelectric dam at Kajaki in Helmand Province. Nine heavy tractors were used for the turbine sections and for other parts of the generator set, six of them M1070Fs from 16 Tank Transporter Squadron and three of them Canadian, accompanied by logistic support and around 100 armoured vehicles. Some 5000 troops were necessary to guard the convoy, which started on Wednesday 27 August 2008 and, travelling at an average speed of just one mile an hour (1.6km/h), took six days to cover the 112 mile (180km) distance from Kandahar air base. During the operation, including the return journey to Kandahar, 250 Taliban were killed during attacks on

● M1070F carrying a Mastiff 6x6 protected patrol vehicle, based on the US Army's Force Protection Cougar. *(Fasttrax)*

the convoy. The Coalition suffered no deaths, but one man had his pelvis crushed when a truck he was attempting to repair slipped off the jack, trapping him underneath.

Accidents

The sheer size of the M1070F and semi-trailer can cause problems on the road, particularly when mixing with 'normal' traffic... and there are all kinds of hazards associated with M1070 tractors in service, for example where bridges

● Loading a Challenger 2 main battle tank onto the King semi-trailer. The driver must have implicit faith in the man on the swan neck since, at this stage, he cannot see the trailer deck at all. *(Crown copyright)*

● Though not visible, the official caption records that US Army Private Kayla Stone, and Privates First Class Jeremy Evans and Kevin Nelson, of the 233rd Transportation Company, observe Private Melanie Fisher practice winching operations with the M1070 in preparation for the final exam of HET driver training. The location is Fort Knox, Kentucky. *(US Department of Defense)*

● Rear three-quarter view of the M1070F tractor showing the semi-trailer swan neck and the fifth-wheel position. The photograph was taken at the British base at Basra International Airport, Iraq, during Operation Telic in January 2008. *(Carl Schulze)*

● 'It's behind you!' Motor transport operators Sergeant Michael Rosales (front) and Staff Sergeant Jared Leimeister (rear), of the 1067th Transportation Company, guide an M1070A1 and M1000 semi-trailer. The 1067th trained on new vehicles in preparation for transformation from a medium truck company into a composite truck company at Fort Indiantown Gap, Pennsylvania. *(US Department of Defense)*

and culverts are constructed to dubious standards and the edges of roadways are not always everything they should be! But, let's face it, in the end the thing is so damn big that it can't always get out of its own way.

In May 2006, an Oshkosh M1070F tractor, number 18KM79, loaded with a Challenger armoured repair and recovery vehicle (CRARRV) overturned on the A31 at the Palmers Ford roundabout, near Ferndown. The tank came to rest upside down, and a 100-tonne crane was required to clear the road, which remained closed for 12 hours.

In September 2011, an Oshkosh M1070F loaded with a Titan armoured bridge layer apparently demolished some cables and a street sign at the roundabout next to 'The Pudding & Pye' pub, in West Street, Wimborne. As if this wasn't bad enough, in May 2015, Wessex FM News announced that there were 'delays on the A31 after a tree was knocked down by a lorry carrying an Army tank'. And in November 2019, a loaded M1070F, carrying a Challenger 2 main battle tank, collided with a hatchback on the Newport southern

distributor road. The road was closed for a short time to allow recovery, but the police reported that there were 'no injuries'.

Registration numbers

Believe it or not, every Oshkosh tractor has a choice of two registration numbers. The MoD style number plate, for example 17KM94 or 18KM19, is used when the truck is performing military duties, including, for example, when on exercise. In this case, the driver must be a serving soldier or a called-up reservist. The second number plate, for example HF53BUO or HF53BCX, is attached to

● M1070F photographed in Helmand Province, Afghanistan in the vicinity of the Price main operating base (MOB). The load, which shouldn't present too much of a challenge to either the tractor or semi-trailer, is a heavy-duty rear-engined excavator. *(Carl Schulze)*

● Well-armoured M1070F carrying a Mastiff protected patrol vehicle on the semi-trailer. *(Carl Schulze)*

● M1070F running on civilian plates. The semi-trailer carries a Warrior infantry fighting vehicle.

● From 2005, British Army M1070F tractors were fitted with an improved version of the add-on armour package, consisting of flat panels to protect the cab, and ballistic glass and wire screens for the glazed areas. *(Carl Schulze)*

● Excellent three-quarter rear view showing the fifth wheel, the winch operator's platform and the (covered) roof-mounted weapons station. Note the textile composite armour. *(Carl Schulze)*

the vehicle for non-military duties, and when this registration is in place, the driver can be either a serving soldier or a civilian. You'd imagine that rotating or reversible plates might be a good idea but, apparently, no-one at the MoD has thought of this.

Quite how this actually works in practice is anyone's guess, but apparently there are insurance and finance implications if the correct number plates are not mounted, as well as the risk of giving DVLA conniptions!

Incidentally, I have tried in vain to find a list of registration numbers, but to no avail. The lowest number I found was 17KM94 and the highest was 18KM78. I know that this series of numbers does not embrace the full production quota of 92 vehicles, but I don't know whether the missing numbers are at the top of the list, at the bottom of the list, or at both ends... so, I'm afraid that it's the best I can do.

Cross-service leasing

On 7 August 2016, the US Army Europe and the MoD signed a cross-service agreement that allowed 18 M1070F tractors, together with their King semi-trailers, to be leased long-term to the US Army. The main reason for the lease is that existing US Army HETs are not able to operate within the weight and axle-loading restrictions of many European nations. The equipment will continue to be the property of the MoD, but will be maintained and operated by the 21st Theater Sustainment Command, headquartered in Kaiserslautern, Germany.

● The seven-axle King semi-trailer will just accept two Warrior infantry fighting vehicles. *(Fasttrax)*

● M1070 tractors being fitted with the 'crew protection kit' at one of the US Army's Baghdad bases. *(US Department of Defense)*

● British Army M1070F, with an armoured 'dozer on the trailer, flying the national flag of Afghanistan. *(Carl Schulze)*

● This is how they look when they are new... no additional armour, no electronic protection systems and no mesh screens! The black box in the centre of the bumper is the antenna for the Eaton Doppler radar collision-warning system. *(Ian Young)*

● M1070F and semi-trailer photographed at the British base at Basra International Airport in January 2008. *(Carl Schulze)*

The first five of these vehicles went to the 51st Transportation Company – the so-called 'Steel Knights' – based at Baumholder, Germany, who were the first unit in the US Army to add the British Army HET system to their fleet, supplementing 13 existing vehicles. Before being allowed to drive the British tractors, personnel were required to attend a three-week familiarisation course on-site at Baumholder. The training sessions were provided by private contractors Andover-based PDM Training Solutions Limited.

● Private First Class Desmond Jones, a motor transport operator with the 109th Transportation Company, 553rd Combat Sustainment Support Battalion, 17th Sustainment Brigade, 1st Sustainment Command (Theater), guides a US Army M1070 through Camp Arifjan, Kuwait in June 2016. *(US Department of Defense)*

Replacement

The PFI contract comes to an end in either 2023 or 2024, but what will happen then remains a mystery. It could be that the MoD will purchase the remaining tractors and semi-trailers for a one-off balloon payment. This would mean that the cost of replacing life-expired engines and transmissions would inevitably fall on the MoD if they wished to continue to use the vehicles. Alternatively, they could be declared as surplus and disposed of by Fasttrax, or possibly scrapped to avoid them falling into the hands of 'undesirables'.

At the time of writing (autumn 2020), and despite over-hyped stories about 'the death of the heavy tank', there does not appear to be any work underway on a replacement vehicle... and time is running short!

● Soldiers with 2nd platoon, 1166th Combat Heavy Equipment Transport Company, 164th Transportation Battalion, pose with the American flag on Contingency Operating Base Speicher, Iraq, August 2010. The 1166th CHC are responsible for moving heavy equipment from bases all over Iraq to Kuwait before it is repatriated or moved to Afghanistan. *(US Department of Defense)*

● M1070F with a single Warrior infantry fighting vehicle.

● With a total combat weight of around 30 ton (30.5 tonne), a pair of FV432 series armoured vehicles can be easily accommodated on the semi-trailer. *(Fasttrax)*

● RIGHT Newly-delivered M1070F and King semi-trailer... note the box-shaped covers protecting the towing eyes on the front bumper.

● BELOW Despite having a maximum speed of 50mph (81km/h) when loaded, the Oshkosh is still able to collect a train of frustrated drivers, all of them nervous at overtaking the near 80-foot (23.4m) length of the beast. *(Phil Moth)*

● US Army M1070A1 belonging to Support & Transport Troop, Regimental Support Squadron, 11th Armored Cavalry Regiment, advances through the National Training Center, at Fort Irwin, California in June 2020. *(US Department of Defense)*

● Dusty M1070F, with a wire cutter to protect the roof gunner, and bar and textile composite armour surrounding the cab, photographed in Helmand Province, Afghanistan. *(Carl Schulze)*

● M1070F with a Chieftain armoured vehicle launched bridge (AVLB) dating from the mid-seventies. This particular example remained in service until 2004, before ending its days as a range target for the RAF! *(Phil Moth)*

● The forward-hinged engine-compartment cover provides easy access and, clearly, there's plenty of space up there to allow the crew to undertake preventative maintenance on this armoured M1070 before heading out on a mission. *(US Department of Defense)*

● The last of 92 M1070F tractors comes off the production line at the Oshkosh plant in Wisconsin. *(Oshkosh via Shaun Connors)*

TYPICAL M1070F LOADS

Vehicle		Description	Date into service
Gun tanks			
Challenger 2	FV4034	main battle tank; 120mm gun	1998
Engineer tanks			
Challenger CRARRV	-	armoured repair and recovery vehicle	1989
Chieftain AVLB	FV4205	armoured vehicle launched bridge	1974
Chieftain AVRE	FV4204	armoured vehicle, Royal Engineers	1987
Terrier	-	armoured engineer vehicle	2013
Titan AVLB	-	armoured vehicle launched bridge	2006
Trojan	-	armoured engineer vehicle	2007
Artillery			
AS-90	-	self-propelled gun; 155mm gun	1992
M109	-	self-propelled howitzer; 155mm	1963
M110	-	self-propelled howitzer; 203mm gun	1963
Other vehicles; maximum two to a trailer, except for MLRS			
Bulldog	FV432 Mk 3	armoured personnel carrier	2006
CET	FV180	combat engineers' tractor	1976
CVR(T)	FV100 series	combat reconnaissance vehicle, tracked	1970
Fox	M93 series	NBC-detection vehicle	2007
Foxhound	-	protected patrol vehicle	2012
FV432	FV430 series	armoured personnel carrier	1963
Husky	-	medium tactical support vehicle	2009
Mastiff	-	protected patrol vehicle	2006
MLRS	M270	multiple launch rocket system	1983
Ridgeback	-	protected patrol vehicle	2008
Warrior	FV510	infantry fighting vehicle; 30 or 40mm gun	1984
Wolfhound	-	heavy tactical support vehicle	2010

Other users

Although the M1070F is unique to the British Army, a number of other, mostly Middle Eastern, countries have purchased M1070 variants.

Largest of these is Egypt, with a total of 249 M1070 tractors and a similar number of Fontaine 635NL five-axle semi-trailers. Other users include Iraq, with 60 tractors and 60 635NL semi-trailers; Jordan, with 50 tractors and semi-trailers; Morocco, who received 63 surplus US Army tractors in 2015/16; United Arab Emirates, with an estimated 20 tractors; Saudi Arabia, which was actually the first export customer back in 1993, with a contract for 50 tractors; and Taiwan, who ordered 16 M1070A1 tractors in 2019.

● This accident was the result of a US Army M1070 going into a skid on a muddy bend at Patrol Base Murray in Afghanistan... the tractor has gone off the edge of the road, and the semi-trailer has shed its load. *(US Department of Defense)*

‘YOU CAN’T PARK THAT THERE...’

The perils and pitfalls of Oshkosh ownership

The first thing to understand is that there is, at present, little prospect of anybody getting their hands on a British specification M1070F, regardless of how deep their pockets. Quite what will happen to the trucks in 2023 when the PFI arrangement comes to an end is anybody’s guess, but they will almost certainly be scrapped, or sold or donated to a developing nation... so no luck there. However, if you feel that you really must own one of these fine machines, then, believe it or not, the US Army has started to dispose of large numbers of older examples of the original M1070.

● ‘...and some way back there, you’ll find the semi-trailer!’ M1070F on display to the public. *(Phil Moth)*

At present, most of the major surplus dealers in Britain and the USA have examples for sale... albeit at relatively high prices, but aside from the collectors’ military-vehicle market, it is difficult to imagine commercial uses for the M1070. It’s a big, thirsty specialised machine, with a fuel consumption of just 3-4 mpg (1.27-1.7km/litre), a low top speed when compared to commercial vehicles, and a heavy maintenance requirement.

One possibility is the heavy-haulage industry. The truck would be more than capable of moving most heavy or awkward indivisible loads – rather as the iconic Diamond T Models 980/981 had been in the ‘fifties – and I have heard of one tractor that has been converted to a heavy recovery vehicle, and another that was used to sledge round timber. Moving buildings might be a possible use, or perhaps as an oilfield pipeline transporter. The weight and width of the tractor means that it does not fall foul of the ‘oversized’ loads legislation... well, not until a trailer is added... and the tractor alone can be driven without escort or warning signs. However, a loaded M1070F, as well as

● Oshkosh and proud of it!

the original M1070, would be subject to STGO Category 3 rules whilst driving on British roads.

At the time of writing (autumn 2020), Withams (www.mod-sales.com) had four ex-US Army vehicles, available at £65,000 apiece (plus VAT!) and described as being in 'ex war reserve' condition, having seen very little use... one example has just 6544 miles (10,060km) on the clock. Similarly, arch rivals, L Jackson & Company (www.army-uk.com), have around a score of M1070s available, dating from 2002 and said to be in 'outstanding condition', with some showing just 500 miles (810km) from a full government rebuild. And Marltrax, based in Great Yarmouth, have also handled a number of these vehicles. Overseas' customers would require a single individual export licence (SIEL).

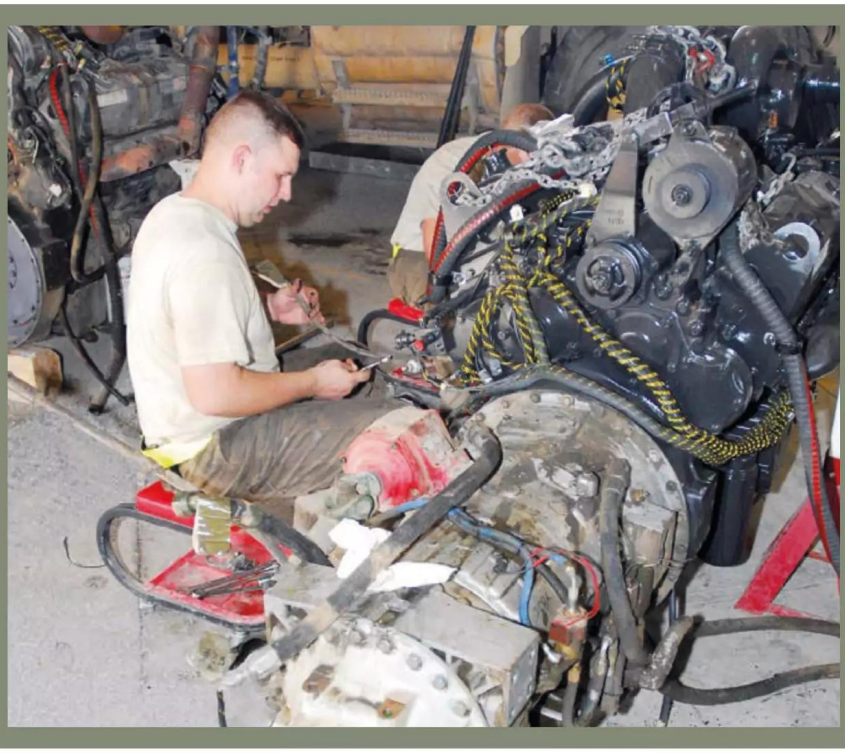
In the USA, similar low-mileage vehicles are available from Government Liquidation (www.govliquidation.com), Eastern Surplus (www.easternsurplus.net), and Midwest Military Equipment (www.midwestmilitaryequipment.com), all similarly priced... and with Eastern Surplus promising 'full parts support'. Whilst Midwest Military Equipment will only sell to US citizens, Eastern Surplus are happy to arrange for export, presumably according to local licensing rules.

● M1070F... the 8x8 driveline, combined with an 18-litre Caterpillar engine, seven-speed automatic gearbox, and inter-axle and intra-axle differential locks, makes this a machine made for the toughest terrain. *(Ian Young)*

● US Army M1070 compared to its predecessor, the M911.

● M1070A1 showing the excellent under-bonnet access.
(US Department of Defense)

● Serious repair work is definitely not for the faint-hearted... here, US Army Specialist Dave Penner (assisted by Jeff Clay), conduct an engine and transmission swap on an M1070.
(US Department of Defense)



● ABOVE 'Maverick Wrench' shows how the hydraulic suspension of the US Army's M1000 semi-trailer allows individual bogie pairs to be lifted clear of the road.
(US Department of Defense)

● BELOW The oldest of the US Army's M1070 tractors date back to 1992 and ex-services trucks are now available through military vehicle dealers... this example was recently sold by UK-based Marltrax Equipment Supply (www.marltrax.com) *(Marltrax)*

● 30-year old M1070 at Eastern Surplus... visit www.easternsurplus.net. *(Eastern Surplus)*

Google the search term 'M1070 for sale'... you'll almost certainly be surprised at what comes up. But, as to whether an ex-US Army M1070 complies with the European construction and use regulations? I don't know the answer, but don't forget that all of the US tractors have left-hand drive.

● Ex-US Army M1070 road-registered for use in Britain. *(Phil Moth)*

● M1070 being used for civilian heavy haulage in the USA... the load is a huge excavator bucket.

● US servicemen of the 721st Transportation Company (HET), 228th Transportation Battalion, get ready to load an M60 tank for a move from Shellsville, Pennsylvania to Fort Indiantown Gap. *(US Department of Defense)*

● Maximum speed, loaded, in this case with a Challenger 2 main battle tank, is said to be 60mph (97km/h). *(Fasttrax)*

Models

In the meantime, you can content yourself with a scale model or two. As always seems to be the case, Accurate Armour offer the best models, but take a look at the following:

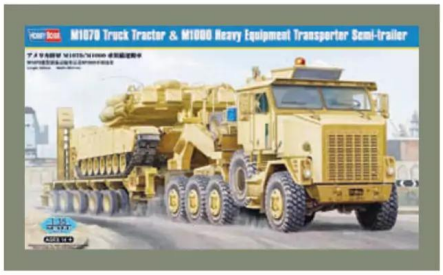
- 3D Ocean; M1070A1; software instructions for 3D printing.
- Accurate Armour; kit number K153; M1070 complete with M1000 semi-trailer; cast resin and etched brass; scale 1:35.
- Accurate Armour; kit number K154; M1070F complete with King GTS110/7 semi-trailer; cast resin and etched brass; scale 1:35.
- Angraf Models; issue 4-2016; M1070 complete with M1000 semi-trailer and Abrams M1A1 tank; laser-cut paper; scale 1:25.
- Hobby Boss; M1070 complete with semi-trailer; injection-moulded plastic and etched metal; scale 1:35.
- Lloyds Toy Plans; plans for a simple wooden model of M1070 tractor and M1000 semi-trailer; scale approximately 1:20.
- Small Scale Model Collection; M1070A1; 3D printed smooth fine-detail plastic; scale 1:72.
- Sword Precision Scale Models; model number TWH-1500; M1070 complete with M1000 semi-trailer; die-cast metal; scale 1:50.
- Takom; kit number TKO-5002X; M1070 complete with M1000 semi-trailer and Abrams M1A2 tank; injection moulded plastic; scale 1:72.
- Trident Miniatures; kit number 81001; M1070 tractor only; cast resin and metal; scale 1:87.
- YVS Models; M1070 complete with M1000 semi-trailer and Abrams M1A1 tank; die-cast metal; scale 1:43.

Although some of these might not still be in production, with a bit of searching on the internet they can probably all be located either used, or as new old stock... and, believe it or not you can also buy an M1070 constructed with Lego bricks, take a look at www.renbricks.com/product/oshkosh-m1070 and others.

And, if you really must have one, ASAM Models can also sell you a kit of the Alvis-Unipower MH-8875... either in full military guise, in ALE's red and white livery, or in the white and blue of Alstom.

● On display again... M1070F complete with King seven-axle semi-trailer. *(Ian Young)*

● US Army M1070 photographed at a meeting of the National Hot Rod Association... whilst not exactly an archetypal 'hot rod', the M1070 nevertheless gained a lot of attention.



● 1:35 scale injection-moulded plastic model of the M1070 and M1000 semi-trailer available from Hobby Boss.

● Plans to build this delightful wooden M1070 and semi-trailer are available from Lloyds Wood Toy Plans *(www.lloydswoodtoyplans.com)*.

THE FINAL WORD

What is the future for the tank transporter?

It has been almost 90 years since the British Army purchased its first tank transporter and some 18 years since it purchased the last. Now, put to one side the Mack, White and White-Ruxtell tank carriers, since they were effectively an evolutionary dead end, and try to imagine the other five vehicles lined-up in front of you. At one end is the original Scammell Pioneer, then we have the production Pioneer, the Diamond T Models 980 and 981, three 'marks' of Thornycroft Antar, the Scammell Commander, and, finally the Oshkosh M1070F. Even the most casual observer would be able to see a common thread that runs across all five generations... typified by a powerful – well, powerful for its time – six- or eight-wheeled tractor combined with a large flat-topped multi-wheeled trailer, or semi-trailer.

Although the design of the Scammell Pioneer dates from 1927, the first tank transporter did not appear until 1932, and for some five years the 16/18-ton Pioneer was the only example of its type in the British Army. Powered by a four-cylinder petrol engine that produced 85bhp (63kW) from 7097cc (432in³), the six-wheeled tractor was coupled to a low-loader semi-trailer via Scammell's version of a fifth wheel. Series production started in 1937. By this time, the tractor was fitted with a six-cylinder 102bhp (76kW) Gardner diesel engine with a capacity of 8369cc (512in³), and was coupled to a 20-ton (20.4 tonne) semi-trailer with a rear bogie that had to be laboriously removed by hand to allow loading. It wasn't long before the semi-trailer was modified to allow loading via ramps at the rear and, soon afterwards, was uprated to 30 tons (30.55 tonne). A total of 574 examples were constructed, 115 of the 20-ton variant and 459 of the 30-ton (30.55 tonne).

However, it was obvious that Scammell was unable to cope with demand for tank transporters and, anyway, the increasing weight of armoured fighting vehicles meant that even the 30-ton (30.55-tonne) load rating was insufficient. In 1942, help arrived from the USA in the form of the Diamond T Model 980, a 40-ton (40.8 tonne) prime mover with a huge 201bhp (150kW) Hercules diesel engine; the Model 981 soon followed, with provision for winching from the front. Although both variants were designed for use with a drawbar trailer, a 30-ton fifth-wheel version was also produced. The Diamond T was a superb

COMPARISON OF FIVE GENERATIONS OF BRITISH TANK TRANSPORTER

	Engine: type	swept volume	power output
Scammell			
Pioneer	Scammell	7079cc (432in³)	85bhp (63kW)
Pioneer TRMU20/TRCU20	Gardner 6LW	8369cc (511in³)	102bhp (76kW)
Pioneer TRMU30/TRCU30	Gardner 6LW	8369cc (511in³)	102bhp (76kW)
Diamond T			
Models 980, 981	Hercules DFXE	14,634cc (893in³)	201bhp (150kW)
Models 980/C6N, 981/C6N	Rolls-Royce C6NFL-143	12,170cc (743in³)	175bhp (130kW)
Thornycroft			
Antar Mk 1	Rover Meteorite Mk 204	18,019cc (1099in³)	250bhp (186kW)
Antar Mk 2	Rover Meteorite Mk 204	18,019cc (1099in³)	260bhp (193kW)
Antar Mk 3/3A	Rolls-Royce C8SFL-843	16,200cc (989in³)	333bhp (248kW)
Scammell			
Commander	Rolls-Royce CV12-TCE	26,100cc (1593in³)	625bhp (466kW)
Oshkosh			
M1070F	Caterpillar C18	18,100cc (1105in³)	700bhp (521kW)

* Includes only tractors supplied to British Army
** Date refers to vehicle conversion

● Three generations of British tank transporter... the M1070F is flanked by the Scammell Commander on the left, and the Thornycroft Antar Mk 3 on the right. The vehicles were photographed at the home of Number 7 Regiment, Royal Logistics Corps at Kendrew Barracks, formerly RAF Cottesmore. *(Crown copyright)*

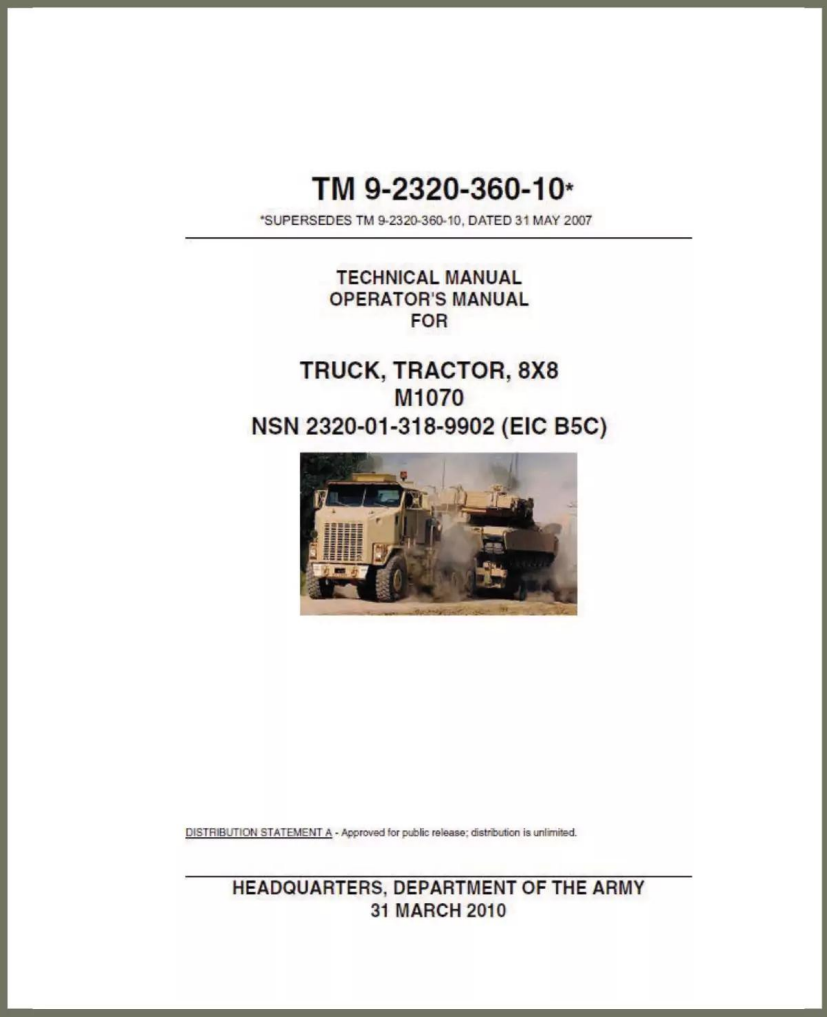
machine and many of the 2255 that were delivered to Britain remained in service into the mid-sixties and beyond, with the majority of these treated to a replacement engine in the form of the 175bhp (130kW) Rolls-Royce C6NFL-143 in 1956/57. With WW2 out of the way, the Fighting Vehicle Research & Development Establishment (FVRDE) was determined to replace the Diamond T, which was now seen as a stopgap, with two brand-new tractors powered by the Rover Meteorite engine... the FV1000, a 60-ton (61.1-tonne) monster capable of hauling up to 100 tons (101.8 tonne), and the FV1200, a 30-ton tractor that could haul a 60-ton semi-trailer. As is often the way of these things, development dragged on without getting anywhere and, possibly, in desperation, the Ministry of Supply turned to Thornycroft who had produced a heavy tractor for use in oilfield work. The Mighty Antar, or simply Antar

Transmission and wheel layout	Maximum speed unladen	Nominal capacity	Date into service	Number constructed
6F1R, 6x4	19mph (30km/h)	16-18 ton	1932	1
6F1R, 6x4	15mph (25km/h)	20 ton	1938	115
6F1R, 6x4	15mph (25km/h)	30 ton	1939	459
4x3F1R, 6x4	23mph (37km/h)	40 ton	1942	2255*
4x3F1R, 6x4	29mph (47km/h)	50 ton	1956**	n/a
4x3F1R, 6x4	28mph (45km/h)	50 ton	1951	23
4x3F1R, 6x4	28mph (45km/h)	60 ton	1952	353*
6F1R, 6x4	32mph (52km/h)	60 ton	1961	218*
6F1R, 6x4	38mph (62km/h)	65 tonne	1984	125
7F1R, full-time 8x8	60mph (80km/h)	72 tonne	2002	92

when in military service, joined up in 1951 in Mk 1 prime mover guise, fitted with a steel ballast box, and powered by a 250bhp (186kW) Meteorite petrol engine. The FV1200 was soon forgotten. The Mk 2 followed, in both fifth-wheel and ballast-box configuration. The final iteration of the Antar was the Mk 3, by now powered by a Rolls-Royce C8SFL-843 diesel engine producing 333bhp (248kW) from 16,200cc (990in³). Total production of all three 'marks' was 594, of which 218 were of the Mk 3 variant.

In 1968 preliminary work began at both Thornycroft and Scammell on a replacement for the Antar. However, it was to be another 16 years before the massive Scammell Commander finally entered service in 1984. Powered by a Rolls-Royce CV12-TCE 12-cylinder turbocharged diesel engine, producing 625bhp (466kW) from 26,100cc (1593in³), the Commander was capable of hauling up to 63.8 ton (65 tonne) on the purpose-designed semi-trailer at speeds of up to 38mph (61km/h). Total production amounted to just 125 examples, and, although it had a chequered development history, the Commander proved itself to be a formidable and extremely capable machine. Despite having been designed for the Cold War, it proved itself in the sands of Iraq and Kuwait, as well as serving in Bosnia and Angola. And for the first time since WW2, the tank-transporter crew was provided with a proper sleeper cab... it was no longer necessary to sleep in the ballast box!

The Commander served valiantly for almost 20 years, but, with just five axle lines, eventually fell victim to increasing concerns over wheel loadings. As you will already have read, in 1998, the MoD issued documentation for a new tank transporter to seven companies, calling for 'private finance initiative' arrangements that would see the civilian contractor shoulder almost all of the risk, as well as employing sponsored reservists to crew the tractors. All but two of the original seven were quickly eliminated leaving a straight fight between Alvis-Unipower with the MH-8875, and Oshkosh with a European version of the US Army's M1070. Both trucks featured all-wheel drive, a feature that had been lacking since the earliest Scammell Pioneer.



TM 9-2320-360-10*

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TECHNICAL MANUAL
OPERATOR'S MANUAL
FOR

TRUCK, TRACTOR, 8X8
M1070
NSN 2320-01-318-9902 (EIC B5C)

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● 'Oh brave new world...' the official Operator's Manual for the M1070 has a page count of 833, with a total of 19 pages at the beginning devoted solely to health and safety warnings. The word 'caution' or 'warning' appears 330 times throughout the manual.

In the end, as you now know, the contract went to Fasttrax Limited and the new tank transporter was the Oshkosh M1070F. A total of 92 vehicles were supplied, together with 89 King seven-axle semi-trailers. With its Caterpillar engine, producing 700bhp (521kW) from a capacity of 18,100cc (1105in³), the Oshkosh is capable of sustained highway speeds of 60mph (100km/h)... and whilst the driver of the old Scammell Pioneer might have envied the sheer power and technology that was now available, he would surely recognise that in many other respects the tank transporter has hardly changed at all!

However, it is, perhaps, a measure of how the world really has changed, even if the role of the tank transporter has not, that the Operator's Manual for the Scammell Pioneer tank transporter runs to 80 pages, whilst the equivalent document for the M1070 has a page count of 833. Of these, a total of 19 pages at the beginning are devoted solely to health and safety warnings, and the word 'caution' or 'warning' appears 330 times throughout the manual... my favourite example reads 'winches are not intended for use in the lifting or moving of persons'. I know that these are safety-obsessed times, but it's hard to imagine what gave rise to that particular caveat.

But think on this... maybe the predicted death of the main battle tank might eventually also lead to the death of the tank transporter... indeed, have we already witnessed its swan song? It is now 2021 and the PFI contract arrangement has been running for almost 20 years... and if past performance is any indicator as to the future, the MoD should already be looking at a replacement for the Oshkosh!

I do not believe that any work has started... but, I wonder what form it might take when it finally does appear.

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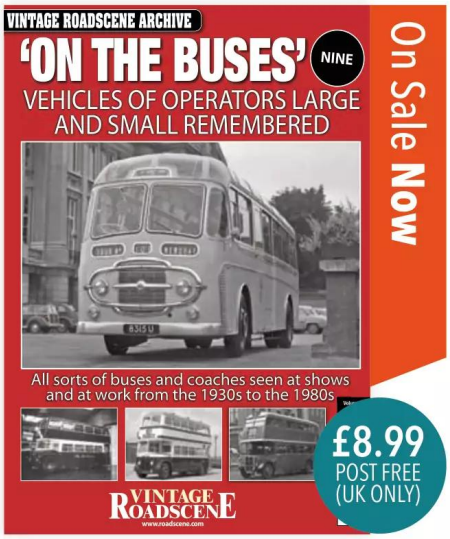
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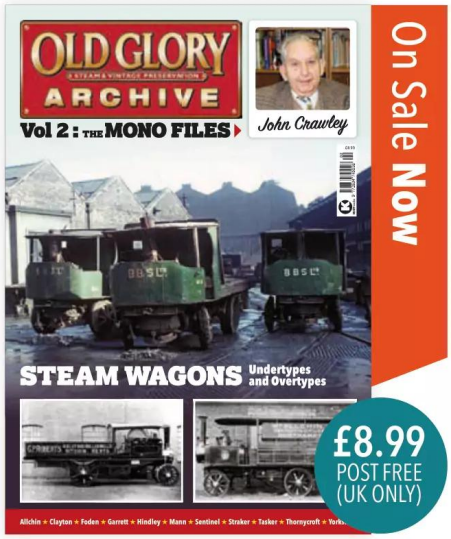

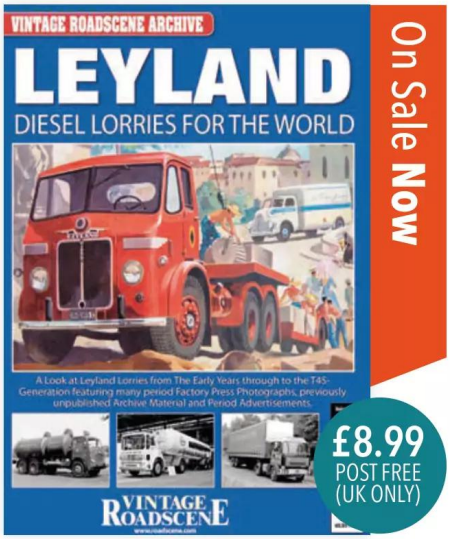
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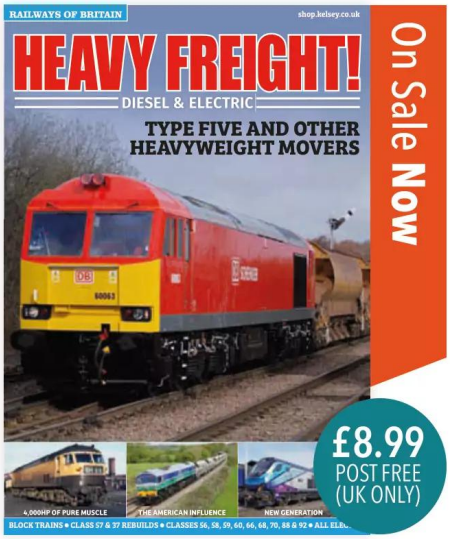

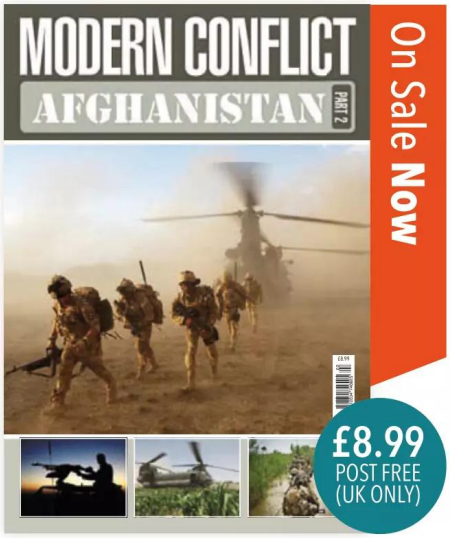

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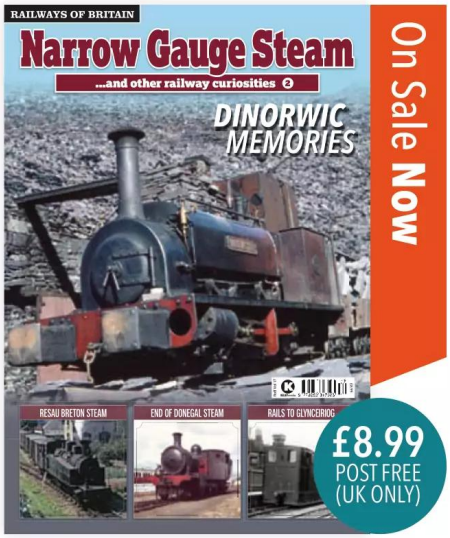

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During the early 'sixties, a number of Mandator chassis were equipped as transporters for the Blue Steel missile. Others were used as tractors for semi-trailers, while the standard commercial

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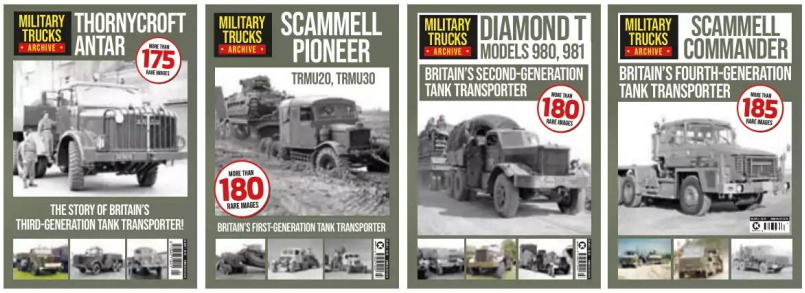
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